ril 1946

Chemical Industries

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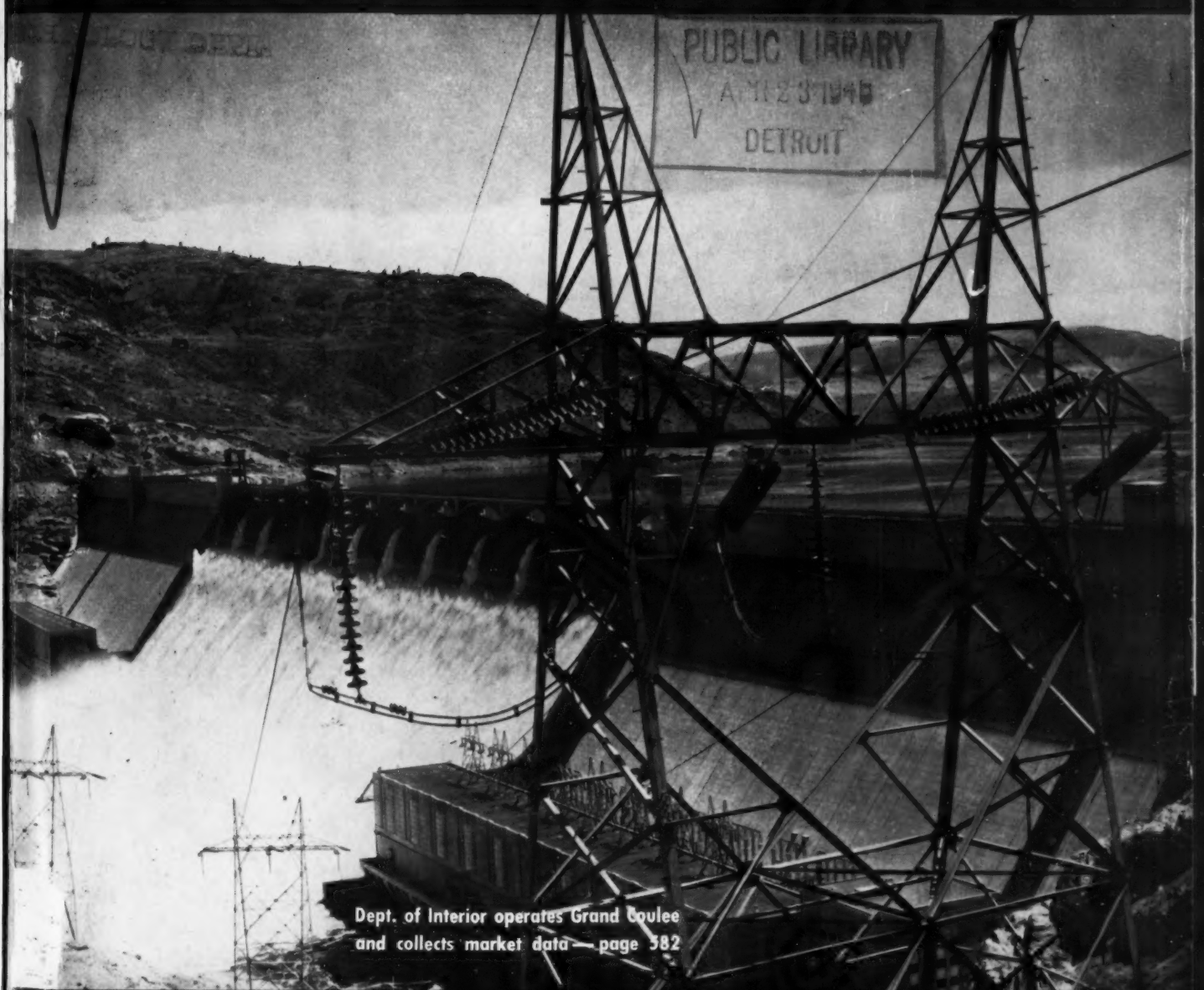

Dept. of Interior operates Grand Coulee and collects market data — page 582

Bill Offered to Clarify Wartime Patents p. 577

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THE CHEMICAL BUSINESS MAGAZINE

Chemical Industries

VOLUME 58
NUMBER 4

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Cover: Photo by U. S. Dept. of Interior, Bonneville Power Administration, Portland, Oregon.

Published monthly, except twice in November, at 1309 Noble St., Philadelphia 23, Pa., and entered as 2nd class matter July 15, 1944, at the Post Office at Philadelphia 4, Pa., under the Act of March 3, 1879. Subscription $4 a year, $6 for two years. Add $2 per year for postage to foreign countries other than Canada and Latin America. Single copies 50c, except November. Canadian subscriptions and remittances may be sent in Canadian funds to Chemical Industries, P. O. Box 100, Terminal A, Toronto, Canada. Copyrighted 1945, by MACLEAN-HUNTER Publishing Corporation, 522 Fifth Avenue, New York 18, N. Y., Murray Hill 2-7888; Horace T. Hunter, President; John R. Thompson, Vice-President and Treasurer; J. L. Frasier, Secretary. Office of Publication: 1309 Noble Street, Philadelphia 23, Pa.
EDITORIAL & EXECUTIVE OFFICES: 522 FIFTH AVE., NEW YORK 18, Murray Hill 2-7888. DISTRICT OFFICES: Chicago: 309 West Jackson Boulevard, Chicago 6, Ill., Harrison 7990. Los Angeles: 816 West Fifth Street, Los Angeles 13, Calif., Mutual 8512. San Francisco: 1105 Russ Bldg., San Francisco 4, Calif., Yukon 1069. London: Quadrant House, 55, Pall Mall, London, S. W. I.
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April 1946

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THE READER WRITES

Hydrogen Addendum

To the Editor of Chemical Industries:

There are some inaccuracies in the report on page 67 of the January, 1946, CHEMICAL INDUSTRIES on the paper "Present-Day Hydrogen Manufacturing Processes" which I presented at the Chicago A.I.Ch.E. convention in December.

The bipolar or filter press type of cell for the electrolysis of water has been used a great deal in Europe, but only on small installations in the United States. The unipolar, or tank type of electrolytic cell has, however, been used quite extensively in this country.

The present production of hydrogen in the United States amounts to about six billion cubic feet per month. (This was an error in the published abstract of the paper).

The electrolysis of water is the only process that has been utilized commercially to any extent in plants producing less than five thousand cubic feet of hydrogen per hour. However, the steam-hydrocarbon process is now being adapted to plants producing as little as one thousand cubic feet of hydrogen per hour. The steam-iron and the steam-hydrocarbon processes are directly competitive in the range of five to fifteen thousand cubic feet of hydrogen per hour. The investment cost of the steam-hydrocarbon process is slightly higher than that of the steam-iron process, but this is offset by the lower operating cost of the steam-hydrocarbon process. In the past two years seven projects for steam-hydrocarbon hydrogen plants in this capacity range have been approved in this country, while there is no record of any steam-iron hydrogen plants having been installed here.

For hydrogen plants having capacities above fifteen thousand cubic feet per hour, the steam-hydrocarbon or the steam-water gas process are employed, the choice depending on the relative costs and availabilities of hydrocarbons and coke, and the purity required in the hydrogen.

R. M. REED, Chief Chemical Engineer
Gas Processes Division
The Girdler Corp.
Louisville, Kentucky.

Doubtless, readers as well as CHEMICAL INDUSTRIES *editors will be interested in the additional information contained in the above comments.*—EDITOR.

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An Engineer Replies

To the Editor of Chemical Industries:

I have read with a great deal of interest your editorial in the February, 1946, issue. Since I was one of the engineers who worked on the Manhattan Project I feel that I have a natural privilege to reply to the accusation made by some "high official of the Manhattan Engineer District."

To a civilian, working under army rules and regulations is a trying experience under the most favorable circumstances. When he is under the kind of pressure which was inherent in this job, the army red tape becomes at times almost unbearable. The complacency with which a great many army officers regard their system of red tape is probably the most obnoxious feature of the system. This complacency led me at one time to remark to one of the army officers connected with the aspect of the project with which I was concerned that apparently everybody was extremely anxious to win the war except the Army. I have never been associated with any project on which so much desperate effort was put in as was applied by the group of civilians with whom I was associated. I should like to say also that many of the army officers were just as intent, but let me point out that these army officers were not from the regular Army. They were civilians in uniform who had their commissions from the reserve and, therefore, cannot be counted as the regular Army.

This points up another conclusion at which I have arrived after considerable thought on the subject and that is that this present war was not won by the United States Army, but by civilians in and out of uniform and there is a vast difference between a professional soldier and a civilian in uniform.

I agree with you that it is high time that considerable thought was given to the type of education being supplied to our present day students in science and engineering. However, I think it behooves any professional army man to make any criticism of it in view of the relative performance of the professional army man and civilians in uniform in this past war.

May I say in closing that I very deeply resent any such implication as is contained in this statement and I do not believe that you have served American engineers at all well by publishing it in your editorial page.

J. B. MCMAHON
Republic Flow Meters Co.
2240 Diversey Parkway
Chicago 47, Ill.

The fact remains that regardless of its justification, the charge was made. If, as Mr. McMahon claims, it is unfounded, it can be denounced only if it is brought out into the open. Thus in publishing the statement, CHEMICAL INDUSTRIES *believes it has done a service to American engineers.*—EDITOR.

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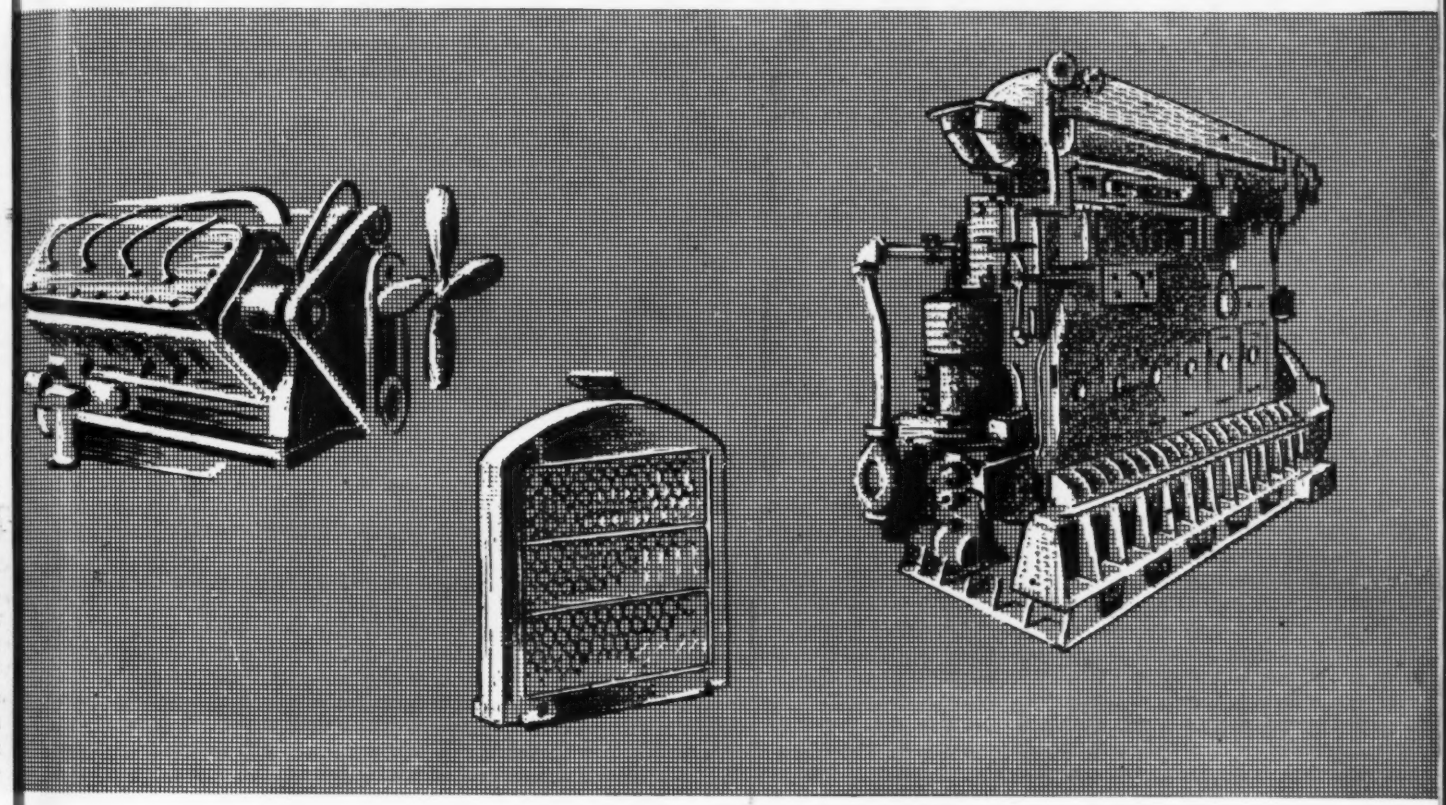

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WASHINGTON

T. N. SANDIFER *reporting*

Controls Continuance . . . Rubber Outlook . . . Govt. Salaries . . . Alcohol Fertilizer Chemicals . . . Farben Conflict . . . Patent Legislation

Forecast Continued Controls

The consensus here is that the trend back to war controls is being intensified by upset world conditions. The retrogression may proceed much further, on this ground, than was contemplated earlier.

Apart from any psychological factor, disturbed world conditions are reflected here in materials and distribution. Some actual material stringencies, it is already known, will result in continued controls in any event.

Rosin stocks were low at 479,000 drums at the year-end, and the outlook for this year indicates a continued tight situation. If there should be any marked upturn in house construction, it is considered inevitable that some former restrictions on rosin use must be re-established.

Civilian requirements for titanium dioxide are mounting, averaging at least 20,000 tons per month, against an average production of 8,000 tons.

A deficit in lead supplies of 200,000 tons is anticipated for the year, leading to consideration of maintaining existing controls on lead consumption, as well as further steps to increase stocks; tin imports will amount to only 42,000 tons in 1946, necessitating heavy drafts on government stocks.

Should actual hostilities develop again, these conditions would be aggravated.

Rubber

Resumption of butadiene production at the Government-owned plant at Institute, W. Va., has aroused considerable interest, as being another step back toward more solid ground, in view of the anticipated short natural rubber supply this year. The estimate of receipts indicates that these will be approximately 100,000 long tons under the amount expected earlier.

Operations at Institute were suspended in November, 1945, and the plant placed in standby condition. At that time the Office of Rubber Reserve had substantial inventories of GR-S (all-purpose synthetic rubber), which with the remaining butadiene capacity, was considered adequate to supply all GR-S requirements for 1946.

Rubber consumption, however, has remained high, and it is now estimated that requirements of GR-S will amount to 600,000 long tons this year. The total capacity of petroleum butadiene facilities remaining in operation under the Office of Rubber Reserve is stated to be equivalent to approximately 550,000 long tons of GR-S.

The Institute plant can produce butadiene for manufacture of approximately 150,000 long tons of GR-S annually. It is not planned at this time to utilize the full capacity. Alcohol for the plant will be supplied from RFC-held stocks, it is stated.

Fertilizer Components Affected by Strikes

Work stoppages in the steel and coal industries have reduced by approximately 124,000 tons the anticipated United States production of sulfate of ammonia. Even with the restoration of production in the affected industries, of which sulfate of ammonia is a by-product, normal production was not expected to be attained again before late March.

Meanwhile, it has been reported by the Inorganics Branch of CPA chemical division that all types of nitrogen except sulfate of ammonia were keeping pace with the program. However, the latter is concededly inadequate to even domestic needs. It comprises an estimated 563,580 tons from domestic nitrogen production, 105,010 tons imported from Canada, and 104,000 tons of Chilean imports.

The shortage of sulfate of ammonia means definitely, it is stated, that there will be no nitrogen fertilizers available for Germany and Japan, since the minimum needs of these two countries alone are equal to 80 percent of United States production. The only solution, as seen here, is to put the nitrogen-producing plants in those countries back into production.

This raises a delicate question, to be elaborated in a succeeding paragraph, as to restoration of industries in the occupied enemy countries. The United States, meantime, is understood to have made no move to supply requirements of the occupied countries. However, the United States will export, principally to Europe, about 15 percent of domestic nitrogen, chiefly ammonium nitrate from ordnance plants, this fiscal year. Imports into the United States will exceed exports by a ratio of 3 to 1, it is stated.

Later, Civilian Production Administration moved to put primary potash salts back under allocation, until current demands in excess of supplies are abated. The foreign production factor is present here, also—France and Germany, normally important sources, cannot be counted on at this time.

Potash was originally removed from allocation in September, last year. Present plans call for restoring allocation by June 1, 1946. As a matter of fact, contract commitments for delivery, made during the allocation period, extended through March 31, 1946, so that free distribution could not start until April 1.

No final decision has been made, it is understood, although the expectation is that pending recommendations for restoring potash to allocation will probably be approved by the various agencies involved.

Investigators Clash on Farben Plants

A Senate Military Affairs subcommittee has been given some interesting, if not surprising facts, as to the extent to which German plants are being retained in activity, instead of being destroyed, as originally ordered.

Russell A. Nixon, formerly acting director of the cartel investigation of the Office of Military Government, told the committee that contrary to two specific orders of the Military Government, key war production plants, especially those of I. G. Farben, had not only been kept in operation, but were being further integrated, re-equipped from Reich-built war plants, and otherwise restored, by officers directly in charge.

The first order directed that laboratories, plants and equipment, as well as other facilities seized by the occupying authorities were to be made available to

devastated non-enemy countries as relief and restitution, especially those producing chemicals, synthetic petroleum and rubber, etc. Other property, not adaptable to such purposes, especially those directly producing war gases, explosives, ammunition, arms, etc., were to be destroyed.

As a side comment on this latter phase of the order, and in reference to production of nitrogen and other fertilizer components in Germany, which apparently is contemplated at CPA, obviously this would bring into operation many of Germany's former explosives and ammunition factories.

This suggests that there is a major conflict in approach to the matter, since the fertilizer production of such plants seems to be needed, and any excess could be used in this country, and at the same time, the fixed idea of destruction of Germany's war potential has a wide hold on the public.

The seeming conflict appears likely to be intensified if the present European food crisis is exploited as a ground for indefinite continued operation of German plants. It may be hard to enforce a policy of destruction under such circumstances.

Alcohol

Despite apparent pressure on all alcohol stocks, the Government is disposing of its experimental plant at Bellingham, Wash., constructed at a reported cost of $1,000,000 to make alcohol, methanol, and fusel oil from waste sulphite liquor.

This may mark the end of the second major effort in this country to utilize pulp liquor for production of alcohol. A similar industry was launched in World War I, and production maintained despite uneconomical costs, as a war measure. During the most critical period of the war-born alcohol demand in World War II the idea was revived. Department of Agriculture technicians evolved an improvement over known German processes which had been in use for a quarter century as a matter of actual necessity in Europe, and at considerable effort the Bellingham plant was completed.

The plant, with a daily capacity of 6500 gallons of alcohol, was operated by the Puget Sound Pulp and Timber Company, and was acquired by the Government. It is now up for sale or lease to private operators.

In view of the pressure on grain for other purposes, and the similar pressure on molasses for sugar, it is not unlikely that regional interests may raise a question as to why this plant is being taken out of production.

Higher Wage Scale Sought for Government Scientists

Major General Leslie R. Groves, remembered for his command assignment in development of the A-bomb, warned Congress at recent hearings that Federal wage scales for scientific and engineering personnel engaged by the Government would have to be raised, if the Government is to "maintain a reasonably strong Government scientific research organization."

Far from being a routine personnel matter, he said, the question of higher salaries for Federally-employed scientists and engineers, in the upper levels especially, was a matter of national defense.

He revealed that the Government has lost able men in the field of atomic research to higher-paying private employment. The present maximum is $9,800 he recalled, and he urged that this be raised to at least $15,000.

It is understood that the Civil Service Subcommittee in the House of Representatives has voted to raise the maximum to $14,000, but this proposal is hedged by the condition that a man qualifying for the $12,000 or $14,000 salary must be engaged in work vital to national security. Army, Navy, and other top-flight government officials have urged that the plan be broadened to eliminate this arbitrary and meaningless restriction.

Patent Situations

The Federal Trade Commission annual report stirred up patent interests with its endorsement of seven proposals for patent legislation which originated with the TNEC (anti-monopoly) Committee of several years back. In fact, one of those closely identified with FTC's patent ideas is said to be Willis J. Ballinger, a former member of the TNEC, and now economic adviser to the Commission.

The FTC recommended legislation to cover licensing of patents, provide for unrestricted licensing, put a limitation on suits for infringement, provide for recording of transfers and agreements, provide for virtual patent seizure by the Government, as a penalty for certain violations, establish a single court of patent appeals and put a limit on the period of patent life of not more than 20 years.

The committee on Patents of the House, Chairman Boykin, of Alabama, favorably reported H. R. 5311, and this bill later passed the House. It makes the basis of recovery in patent-infringement suits, general damages, not less than a reasonable royalty, plus interest from the time of infringement, rather than profits and damages. The bill, in other words, would empower equity courts to assess general damages, irrespective of profits, on the ground that infringement frequently involves only an improvement in a complex machine or development, and, according to the bill's sponsors, it is difficult to properly apportion the profits that might be claimed. The result, so it is argued, has been litigation protracted for decades in some instances.

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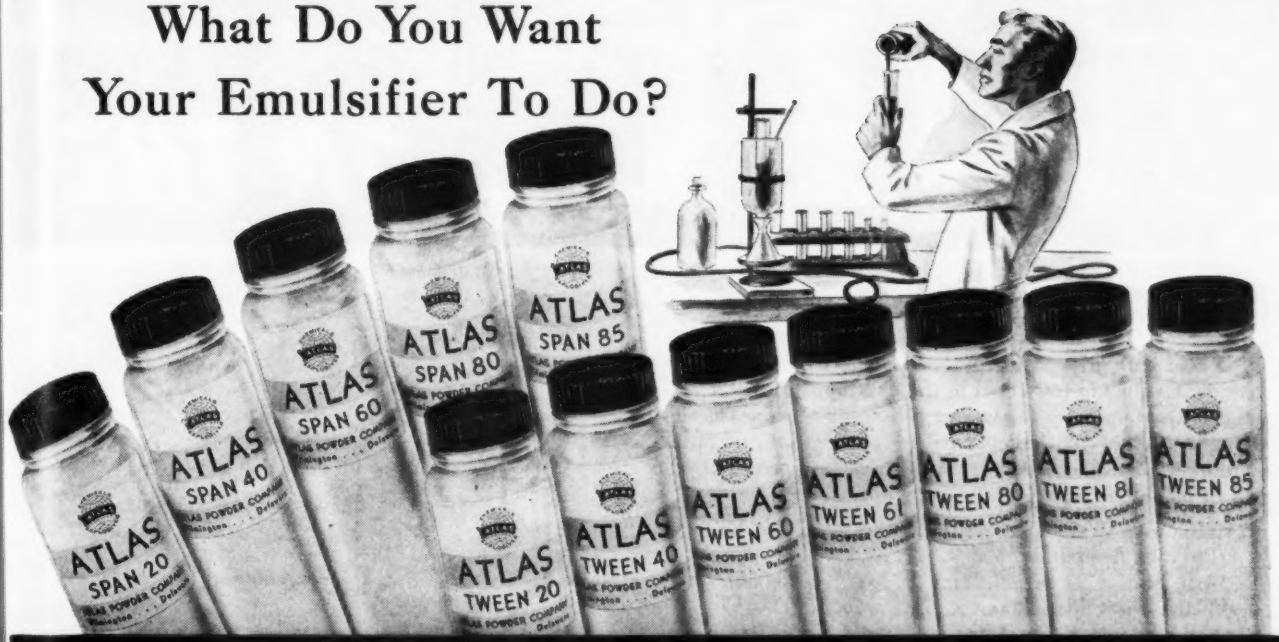

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ATLAS INDUSTRIAL CHEMICALS DEPARTMENT

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. · *Offices in principal cities* · *Cable Address—Atpowco*

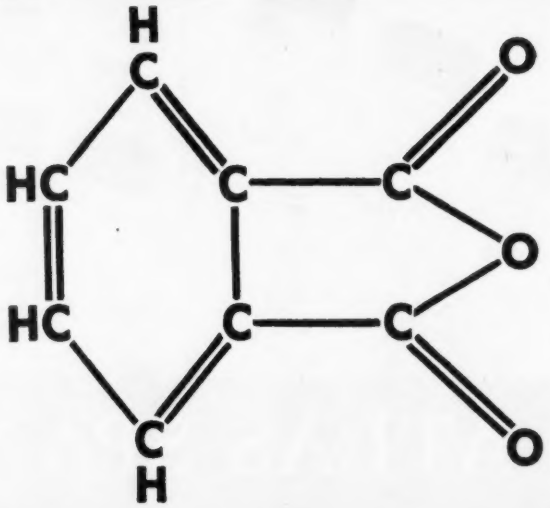
LIFE...ON THE

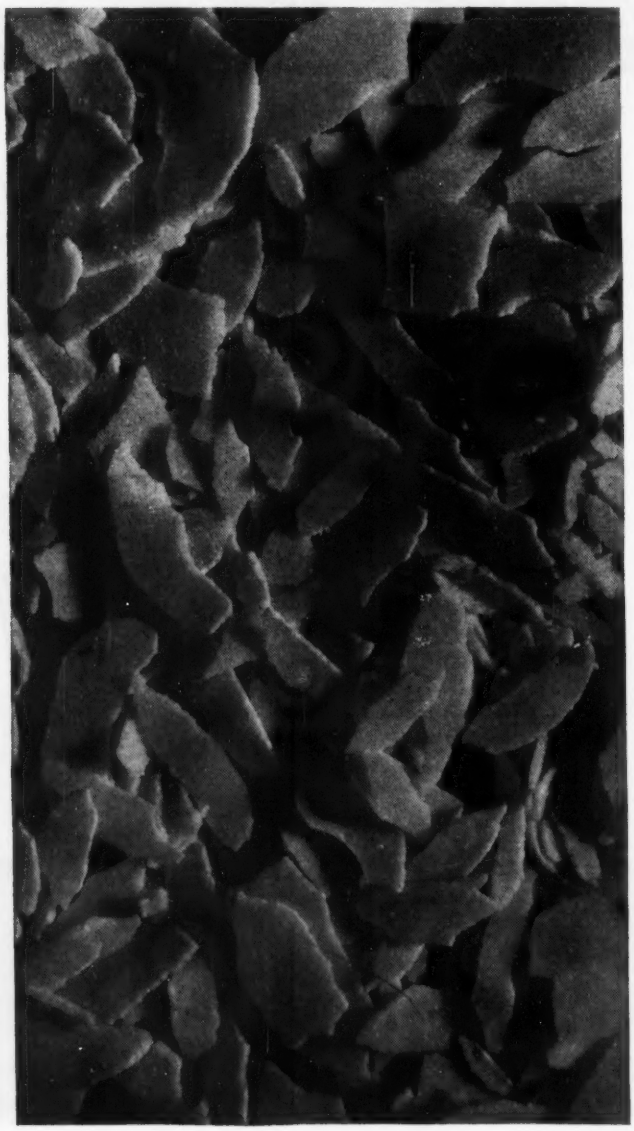
PHTHALIC ANHYDRIDE MEETS BROADENING DEMAND. The high degree of purity and low cost of this extremely useful dibasic acid anhydride is a tribute to modern science and engineering. Cyanamid pioneered in the developmeat of Phthalic Anhydride and operates the largest producing unit in America. Cyanamid's AERO** Phthalic Anhydride is used in the manufacture of dyes, pharmaceuticals, rubber plasticizers, and phthalic alkyd resins for surface coatings.

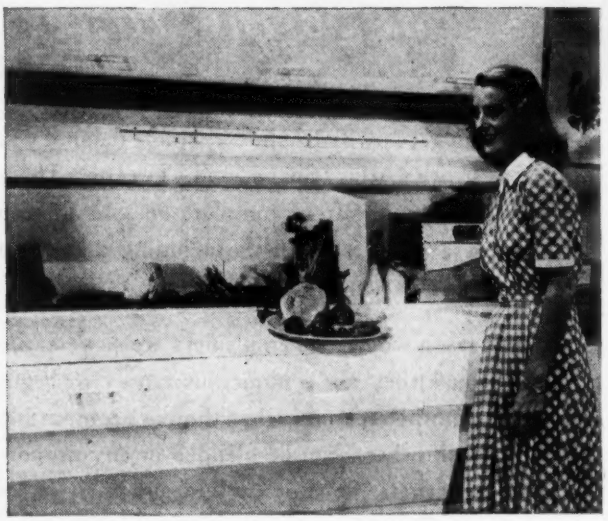
Molecular Weight	148.11
Phthalic Anhydride, Min	99.7%
Ash, Max	0.005%
Water Insolubles, Max	0.002%
Solidification Point, Min	130.1 C.

Appearance: Pure White, free-flowing flakes
Odor: Very mild and characteristic

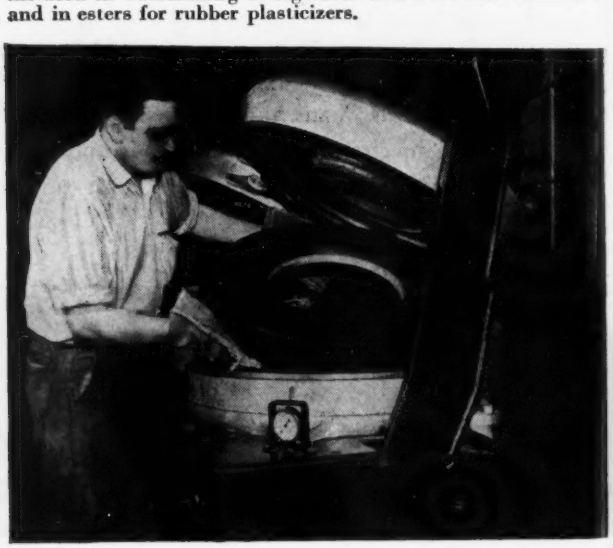
Address your inquiries to Protective Coating Products, Dept. 19, American Cyanamid & Chemical Corporation.







AERO Phthalic Anhydride is the basic ingredient for alkyd resins used in outstanding refrigerator and automotive finishes and in esters for rubber plasticizers.



CHEMICAL NEWSFRONT

(Left) **A FINISH THAT STARTS A NEW TREND IN TEXTILE PROCESSING.** Superior, lasting softness for textiles is imparted by DECERESOL* 1861 Softener, a durable type softener composed of surface active colloids and possessing a high degree of compatability. At optimum concentrations it imparts a superior softening with a soft, silky, but not raggy hand to woolens, cottons, and rayons, as well as to other yarns and threads. DECERESOL 1861 reduces bleeding of direct colors, decreases crocking of napthol colors and inhibits gas-fading tendencies of certain acetate colors. In warm water solutions, ordinary stirring produces good dispersion and stable suspension.

DECERESOL 1861 Softener has a number of other important advantages for textile finishing. It is excellent for yarns, fabrics, and knit goods where maximum elasticity is desired. It will not discolor white goods when specified concentrations are applied, and will not develop odors on goods. It retains its softening properties after repeated washing or dry cleaning of fabrics.

Detailed information as to special properties and methods of application of DECERESOL 1861 will be sent on request.

(Right) **BUY-APPEAL CONTAINERS AND CLOSURES—** BEETLE* PLASTIC containers for Charles of the Ritz cream rouge, cake rouge, and eye shadow have distinction, style, beauty, and product identity. Such colorful, practical packages can, and do, help sell cosmetics, beauty preparations, and other items that depend on popular appeal and approval for initial as well as repeat sales. BEETLE plastic is an ideal packaging material for many reasons. It is chemically inert, dimensionally stable, resistant to wear, and abrasion. It can be produced in any standard color, or combination of colors, by mass packaging methods at low cost.

Cyanamid's BEETLE plastic has been a sales success in a host of other fields as well. BEETLE housings for clocks, razors, radios, and other electric mechanisms give needed protection to delicate mechanisms, and have the charm of color, pleasantness of texture, and lastingly beautiful finish to please customers. BEETLE lighting fixtures and reflectors have proved most efficient for scientific lighting.

Complete information on BEETLE, the "Plastic That's All Color in All Colors," is available from Cyanamid's Plastic Division.

*Reg. U. S. Pat. Off. **Trade-mark

American Cyanamid & Chemical Corporation

A Unit of American Cyanamid Company

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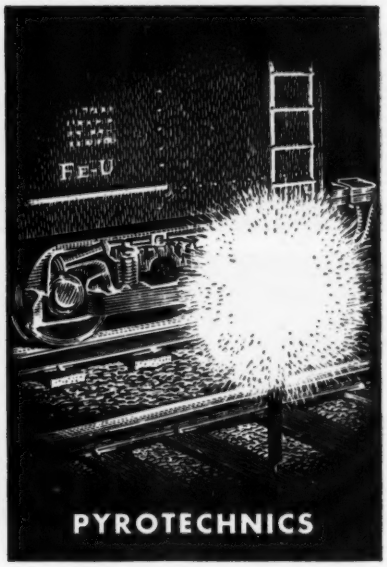
MATCHES

MINING EXPLOSIVES



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POTASSIUM CHLORATE

In products where quality is important, Penn Salt Potassium Chlorate finds wide acceptance. Every step in the production of Potassium Chlorate from raw material to the finished product is carefully inspected.

YOU GET POTASSIUM CHLORATE OF A UNIFORMLY HIGH QUALITY WHEN YOU BUY FROM PENN SALT!

Besides playing an important part in the manufacture of matches, explosives and pyrotechnics, Potassium Chlorate is essential in the making of paper, dyes and disinfectants. It is extremely active . . . reacts rapidly and completely with other ingredients to produce an excellent fusion.

Write us for further information about Penn Salt Potassium Chlorate

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MANUFACTURING COMPANY
Chemicals

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cutting into

YOUR PROFITS?

Laboratory tests prove that milling and processing times may be measurably reduced by the use of BAKER PLASTICIZERS when compounding vinyls, cellulosics, GR-S, GR-N, GR-M. Increased production at lower cost is possible because our plasticizers have unique powers of

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BAKER CASTOR OIL COMPANY

Established 1857

120 Broadway, New York 5, New York

Chicago, Illinois Los Angeles, California

From now on.....

100 YEARS of "KNOW HOW"

back of every POWELL VALVE

Fig. 150—150-pound Bronze Globe Valve with screwed ends, union bonnet and renewable composition disc.

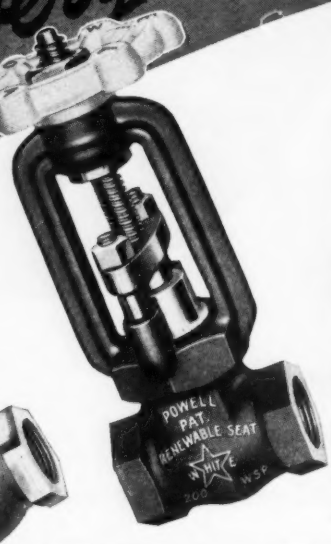

Fig. 386—200-pound Bronze Gate Valve with screwed ends, outside screw rising stem, screwed-on yoke and bonnet, renewable, wear-resisting "Powellium" seat rings and taper wedge solid disc.

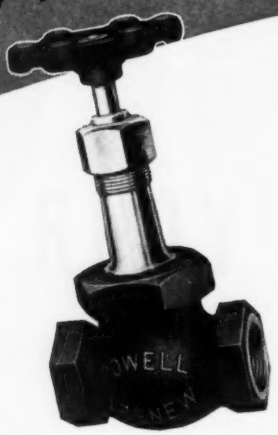

Fig. 190 — 150-pound Iron Body Bronze Mounted "Irenew" Globe Valve with screwed ends, union bonnet and regrindable, renewable wear-resisting "Powellium" seat and disc. Also available in All Iron for steam and water lines.

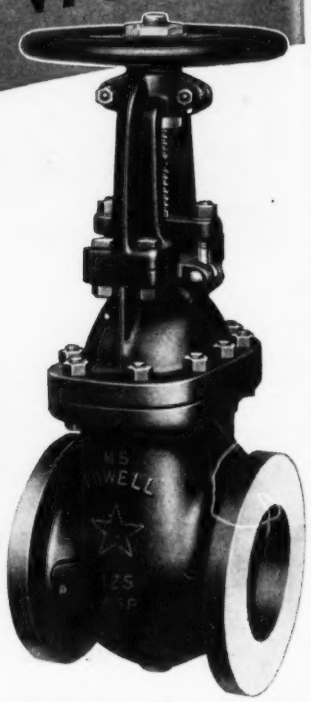

Fig. 1793—125-pound Iron Body Bronze Mounted Gate Valve. Flanged ends, outside screw rising stem, bolted flanged yoke, bronze seat rings and taper wedge solid disc. Also in All Iron for steam and water lines.

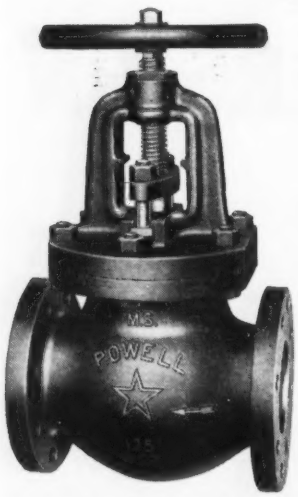

Fig. 241—125-pound Iron Body Bronze Mounted Globe Valve. Flanged ends, outside screw rising stem, bolted flanged yoke and regrindable, renewable bronze seat and disc. Also available in All Iron for steam and water lines.

FOR 100 YEARS, Powell has been concentrating on making valves—and valves only—to meet the ever-changing demands imposed by the amazing progress of American Industry. And through these years Powell has built up a notable line of Bronze and Iron Valves of all types and many designs. This line is so complete that today there's a Powell Bronze, Iron Body Bronze Mounted or All Iron Valve for every service in which these valves are applicable.

These, together with a complete line of Cast Steel Valves and all types of Valves for Corrosion Resistance, make up the Powell Line of Valves for the Chemical and Process Industries. The Corrosion Resistance Line includes many specially adapted patterns and is available in the widest variety of pure metals and special alloys ever used in making valves.

The Wm. Powell Co., Cincinnati 22, Ohio

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Fig. 500—125-pound Bronze Gate Valve with screwed ends, inside screw rising stem, screwed-in bonnet and either taper wedge solid or double disc.

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. . . investigate "cationic germicides"

HIGHER PUBLIC HEALTH STANDARDS — make investigation of these compounds a "must" for all progressive disinfectant manufacturers. ONYX, after 35 years of extensive research and as a supplier of Cationic Germicides to the Armed Forces, recommends: ALKYL DIMETHYL BENZYL AMMONIUM CHLORIDE 50%. Suitable for dilution by disinfectant manufacturers . . . Odorless . . . Colorless . . . Chemically and Bacteriologically controlled.

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- Toxicity Studies
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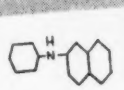
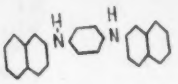


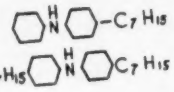
Phenyl B Naphthyl Amine

Distilled—Available in commercial quantities
M. P. 107°
Purity 99.5%
Commercial—Available in commercial quantities
M. P. 106°
Purity 98.0%



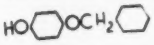
Di B Naphthyl p Phenylene Diamine

Available in commercial quantities
M. P. 230° C
Purity 98%



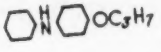
Mixed Mono-and Diheptyl Diphenyl Amines

Available in commercial quantities
Distillation range—145-245
(3.0 mm)
Purity 98%



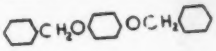
Monobenzyl Ether of Hydroquinone

Available in commercial quantities
M. P. 113°
Purity 90%



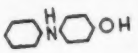
Isopropoxy Diphenyl Amine

Available in commercial quantities
M. P. 78°
Purity 92% min.



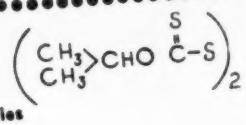
Dibenzyl Ether of Hydroquinone

Available in Pilot Plant quantities
M. P. 119°
Purity 85%



p Hydroxy Diphenyl Amine

Available in commercial quantities
M. P. 15°
Purity 92%

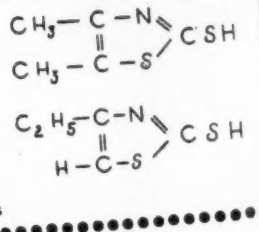


Di Isopropyl Dixanthogen

Available in commercial quantities
M. P. 52°
Purity 98%

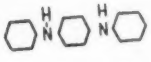
N-Nitroso Diphenyl Amine

Available in commercial quantities
M. P. 62°
Purity 97%



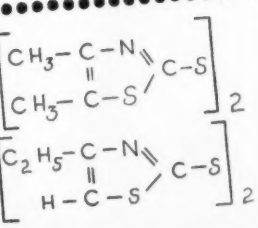
Mixed Ethyl and Dimethyl Mercaptothiazoles

Available in commercial quantities
M. P. 136-153°
Purity Approximately 85% dimethyl and 15% ethyl mercaptothiazoles



Diphenyl p Phenylene Diamine

Available in commercial quantities
M. P. 144°
Purity 92%



Mixed Aliphatic Thiazyl Disulfides

Available in commercial quantities
Liquid

For additional information please write B. F. Goodrich Chemical Company, Department CD-4, Rose Building, Cleveland 15, Ohio

B. F. Goodrich Chemical Company

A DIVISION OF THE B. F. GOODRICH COMPANY

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KELCO ALGIN

Many happy blendings are the result of KELCO ALGIN being Host at the Wedding. It joins ingredients into a state of perfect union — yet remains entirely in the background.

KELCO ALGIN is a skilfully-refined product of Nature — accurately processed to the most exacting specifications for absolute, uniform performance. Constantly, new uses are being discovered for KELCO ALGIN in food, pharmaceutical, and other industrial applications. It has been found ideal in countless varied uses — as a stabilizing, emulsifying, bodying, thickening, suspending or film-producing agent.

KELCO ALGIN never varies with changing conditions. It will adapt itself to the precise, exact standards required for your specific application. It is a guarantee of uniform results — and can be subjected to rigid processing.

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When imported raw materials went off the market, the shortages were met with domestic Hardesty products. As many Hardesty customers already knew, Hardesty chemicals not only could *replace* the wartime materials—they performed better than the imported products which were supplied uncertainly even in peacetime. New users soon learned that Hardesty's domestic materials were available in sufficient quantities to meet manufacturing schedules and were priced to fit their cost sheets.

In the case of red oil, oleic and other fatty acids, for instance, it was soon proved that these products not only served well as replacements — they provided the perfect answer to many of the problems in postwar competition.

Hardesty laboratory technicians, with long experience in the chemistry of fatty acids and related products, worked continuously during the war to perfect new products and methods. Working with one formula after another, finding new uses they evolved with the elusive formulations which give such outstanding performance to every Hardesty customer.

The high quality so inherent in every Hardesty product is a direct outgrowth of this long experience. No matter what your manufacturing process may be, if you can use a Hardesty product it will pay you to keep in touch with Hardesty. Greatly expanded facilities, a fund of technical knowledge and experience are ready to contribute to solving your problems of peacetime usage.

Hardesty Products:
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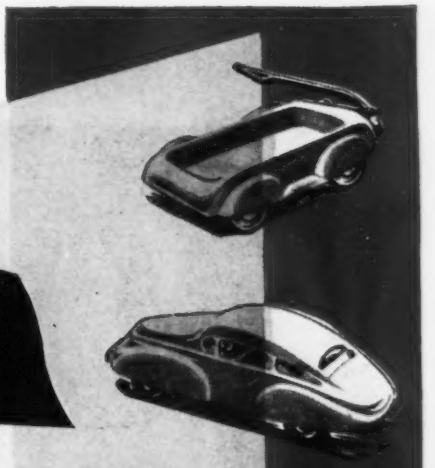
VELSICOL AD-6-3



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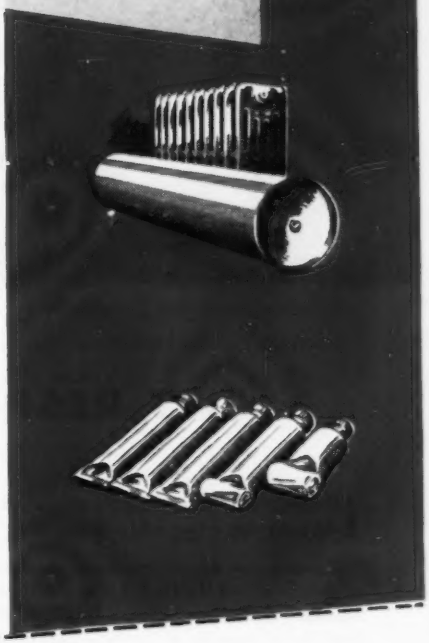
Whether you are looking for specific properties such as good water or alkali resistance, exceptional flexibility, good can stability, or for general all-around wearing qualities, you will find complete satisfaction in finishes based upon VELSICOL AD-6-3. This neutral resin is easy to formulate for air-dry or baked finishes. It is compatible with all drying and semi-drying vegetable and marine oils, accelerates the drying of slower drying oils, and is soluble in aromatics and aliphatics.

A partial list of recommended uses for VELSICOL AD-6-3 includes priming vehicles (air-dry and bakes), industrial enamels, architectural whites and light tint enamels, floor and trim varnishes, aluminum vehicles, furniture rubbing varnishes, and tube lithographing enamels.



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...IT RESPECTS NEITHER AGE NOR SEX

IF this child were yours...you would do anything to save him from cancer.

Cancer now ranks second as a cause of death in the United States: unless something is done about it, 17,000,000 American men, women and children now living will die of cancer.

That means that an average of one in every eight of us faces eventual death from this most dreaded of all diseases!

Cancer is no respecter of age or sex: more than 175,000 men, women and children will be its victims during 1946 in this country alone. While medical science has been winning victories over many diseases, deaths from cancer have been steadily increasing. Today more children between the ages of 5 and 20 die of cancer than die of the following four diseases combined: Diphtheria, Infantile Paralysis, Scarlet Fever and Whooping Cough.

The great tragedy of this is that 30% to 50% of cancer deaths are needless. They could have been saved by early recognition of the symptoms of cancer and by early and proper treatment.

It is up to every one of us to help in the fight against cancer on three fronts:

1. To spread the knowledge that cancer is frequently curable if diagnosed in its earliest stages. 2. To provide the most modern facilities for the care and treatment of present cancer patients, and, 3. To launch a really comprehensive, nationwide cancer research program to find the basic cause and cure of cancer.

No one is safe from cancer. And no sacrifice is too great to protect a loved one from it.

GUARD THOSE YOU LOVE...
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Sirs:

- ☐ I enclose $.....as my gift to fight cancer.
- ☐ Please send me, without cost, information on the "danger signals" of cancer, to protect myself and my family.
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If it's a question of the proper *"Know How"* in your process, Nuchar technicians stand ready at any time to help solve your purification problems. Whether you make acids, alcohols, dyes, oils, waxes—or any of a hundred other products—our staff can show you how Nuchar can be used to remove hidden or invisible impurities. Nuchar is produced and offered in a number of standard qualities designed to take care of a wide range of conditions. Special qualities also are available to meet specific problems. Write today for information and samples.

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Industrial Chemical Sales, Division West Virginia Pulp & Paper Company, 230 Park Avenue, New York 17, N. Y.

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NUCHAR

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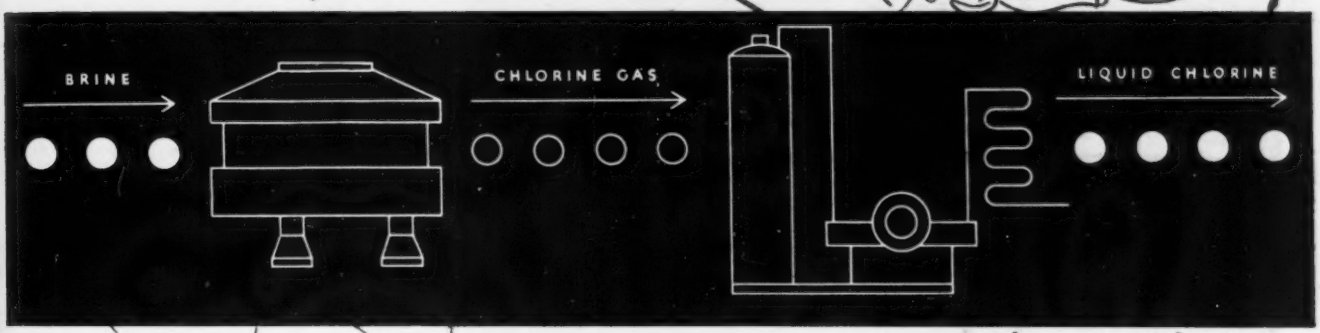
The modern equivalent of a knight is a scientist — fighting disease instead of dragons. *Chlorine*, developed by scientists, safeguards public health in many ways. It aids in the purification of water supply . . . the sterilizing of food equipment . . . the treatment of effluent at sewage disposal plants. It is used as the base for many insecticides.



From electrolytic cells at Wyandotte Chemicals Corporation, a constant stream of chlorine gas is dried and liquefied to become the liquid chlorine of commerce — serving many industries.

In the manufacture of paper, chlorine is essential to the bleaching of pulp — which makes the finished product whiter and brighter. It is used in great quantities by the textile industry for the bleaching of textiles. And chemical derivatives of chlorine are useful in making plastics . . . dry-cleaning solutions . . . anti-freeze solutions.

So the part of Wyandotte in the production of chlorine is important to *both* the health and the industry of America.

Wyandotte
REG. U. S. PAT. OFF.

OFFICES IN PRINCIPAL CITIES

WYANDOTTE CHEMICALS CORPORATION • WYANDOTTE, MICHIGAN

Soda Ash • Caustic Soda • Bicarbonate of Soda • Calcium Carbonate • Calcium Chloride • Chlorine
Hydrogen • Sodium Zincates • Aromatic Intermediates • Dry Ice • Other Organic and Inorganic Chemicals

PURE Vitamins

—*products of Merck Research*

Merck research has been directly responsible for many important contributions to the synthesis, development, and large-scale production of individual vitamin factors in pure form.

In a number of instances, the pure vitamins may be considered to be products of Merck research. Several were originally synthesized in the Merck Research Laboratories, and others have been synthesized by Merck chemists and collaborators in associated laboratories.

Because most of the known vitamins have now been made available in pure form, effective therapy of specific vitamin deficiencies can be conducted on a rational and controlled basis, under the direction of the physician.

You are invited to write for literature

MERCK & CO., Inc. *Manufacturing Chemists* RAHWAY, N. J.

M E R C K contributions

1934 — Ascorbic Acid Merck was made available by Merck & Co., Inc.

1936 — Crystalline Vitamin B_1 was synthesized in the Merck Research Laboratories.

1937 — Vitamin B_1 (Thiamine Hydrochloride Merck) was made commercially available.

1938 — Nicotinic Acid Merck (Niacin) and Nicotinamide Merck (Niacinamide) were made available.

1938 — Riboflavin Merck was the second pure crystalline vitamin to reach production during that year.

1938—Alpha-Tocopherol (Vitamin E) was identified and synthesized by Merck chemists and their collaborators in other laboratories.

1939 — Crystalline Vitamin B_6 was synthesized in the Merck Research Laboratories.

1940—Vitamin B_6 Hydrochloride Merck (Pyridoxine Hydrochloride) became available.

1940—Alpha-Tocopherol Merck (Vitamin E) was made commercially available.

1940—Vitamin K_1 Merck (2-Methyl-3-Phytyl-1, 4-Naphthoquinone) was made available.

1940 — Menadione Merck (2-Methyl-1, 4-Naphthoquinone), a pure compound having marked Vitamin K activity, became available.

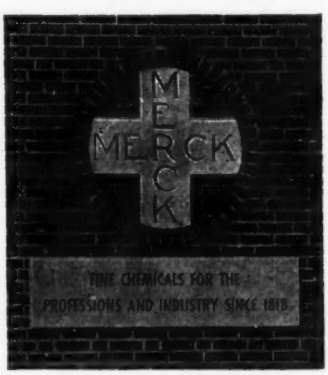
1940 — Crystalline Pantothenic Acid, member of the Vitamin B Complex, was identified and synthesized by Merck chemists and their collaborators in other laboratories.

1940 — The Calcium Salt of Dextrorotatory Pantothenic Acid was made available by Merck & Co., Inc.

1943—Crystalline Biotin, member of the Vitamin B-Complex, was synthesized in the Merck Research Laboratories.

1944—Biotin Merck was made available by Merck & Co., Inc.

Merck & Co., Inc. now manufactures all the vitamins commercially available in pure form, with the exception of vitamins A and D.



Mallinckrodt STANDARDIZED STEARATES

VARIETY
IN TYPES AND GRADES
UNIFORMITY
IN COMPOSITION AND HIGH QUALITY

PROCESSING PROBLEMS **are simplified by using MALLINCKRODT *STANDARDIZED* Stearates—whether in lubricants, paper coatings, paints and varnishes, water repellents, cosmetics, pharmaceuticals, or to modify other colloidal systems.**

You'll find *variety* combined with rigid *uniformity* in the MALLINCKRODT *STANDARDIZED* Line.

ALUMINUM STEARATES

Aluminum Stearate Technical M (mono—) $Al(OH)_2St$
Aluminum Stearate Technical D (di—) $Al(OH)St_2$
Aluminum Stearate Technical T (tri—) $AlSt_3$

Standardized mono-acid, di-acid, and tri-acid Stearates permit you to control gel properties by varying acid-base ratio.

Aluminum Stearate Technical D 5-48—Of special interest for those requiring higher gel and dropping point greases than regular Aluminum Stearate Technical D.

Aluminum Stearate Technical D Fluffy—For uses requiring a di-acid grade of higher bulk.

Aluminum Stearate Technical T-D— Intermediate between T and D. Used primarily by paint and varnish manufacturers.

Flatting Agent No. 22—A special di-acid Aluminum Stearate for use in processes requiring outstanding flatting effect.

CALCIUM STEARATES

Calcium Stearate Technical—Moderate bulk—for use in paints, water proofing and similar applications.

Calcium Stearate Impalpably Powdered — High bulk especially satisfactory for use in plastics, tablet making, and non-blocking or non-sticking functions.

MAGNESIUM STEARATE

Magnesium Stearate Impalpably Powdered — A high-bulk grade, especially satisfactory for cosmetics and protective powders, creams and ointments.

ZINC STEARATES

Zinc Stearate Technical—For the rubber industry and similar uses.

Zinc Stearate U. S. P. XII

Zinc Stearate U. S. P. XII "S"

These grades differ in physical properties, and have selected applications in cosmetics and pharmaceutical products.

Powder Base SP—A high-grade zinc soap for cosmetic uses.

Samples on Request

MALLINCKRODT CHEMICAL WORKS

79 Years of Service — *to Chemical Users*

FINE CHEMICALS Mallinckrodt SINCE 1867

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CHEMICALS

VETERANS OF WORLD WAR II:
To help you in purchasing surplus property from War Assets Corporation, a veterans' unit has been established in each of our Regional Offices*.

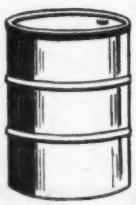
GOVERNMENT-OWNED SURPLUS NOW!

The chemicals shown here are surplus war material. They are available now at quick sale prices to meet civilian production needs. As with hundreds of other similar surplus chemicals they may be obtained by writing, wiring, or phoning your nearest War Assets Corporation office*. Make it *your* habit to check this source whenever your stock needs replenishing.

HYPOCHLORITE BLEACH—one year old material; manufactured with 30% available chlorine; grade 3; available as follows for 1½ cents per pound in carload lots; (F.O.B. location).

Birmingham — 305,600 lbs. in 400 lb. drums. Also one carload of grade 2, packed in 100 lb. drums.

Salt Lake City—8,785,572 lbs. in 43 and 50 lb. steel drums.



40% CHLORINATED PARAFFIN for fire proof, water proof and mildew proof coatings. Approximately 9 million pounds available for 2 cents per pound in car load lots or total amount at a single location, F.O.B. location as follows:

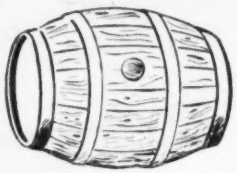
Boston, Cleveland, Detroit, Philadelphia, Richmond and Salt Lake City

MIXED XYLIDINES; 7 cents per pound, carload lots, F.O.B. location.

POTASSIUM SULPHATE available for 10 cents per pound, F.O.B. location as follows:

Minneapolis: 93,075 lbs. in 400 lb. (app.) wooden barrels.

Chicago: 53,355 lbs. in 35 lb. fiber drums.



**In directories simply look up Reconstruction Finance Corporation. War Assets Corporation is an R.F.C. subsidiary.*

PAINTS

OIL TYPE, READY MIXED PAINT—SPEC. T-1215

Ready for use. This paint, containing linseed oil, may be brushed or sprayed to produce a flat finish which dries in a few hours. It is well suited to both interior and exterior walls wherever a medium grade low cost paint is permissible. It may be applied to wood, brick, masonry or concrete.

FOR INDUSTRIAL USES

Warehouses, Office Buildings, Shops & Garages, Housing, Fencing, Factories

COLORS

Light Green, Dark Green, Field Drab, Earth Yellow, Earth Brown, Sand, Olive Drab, Loam, Earth Red, Haze Gray, Black, White

For detailed information contact any of the War Assets Corporation Regional Offices below:
Price: 65 cents per gal., F.O.B. location; minimum sale, 200 gallons.

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To War Assets Corporation:

Without obligation, please send me further information on the following products and place my name on your regular mailing list:

- ☐ Glacial Acetic Acid, C.P. in one gal. bottles.
- ☐ Copper Napthenate, 8% solution in drums.
- ☐ Sodium Sulphite
- ☐ Manganous Chloride
- ☐ Smokeless Powder
- ☐ D.N.T. (Dinitrotoluol)
- ☐ Silica Gel; in various small size fabric bags weighing from 15 grams to 10 lbs. each.
- ☐ Khaki Dyes (basic colors)

Firm.....

Street.....

City.....State.....

155-2

A DISPOSAL AGENCY DESIGNATED BY THE SURPLUS PROPERTY ADMINISTRATION for Surplus Producers' and Capital Goods, Aircraft and Plants formerly handled by Reconstruction Finance Corporation . . . and for Surplus Consumer Goods formerly handled by United States Department of Commerce.

WAR ASSETS CORPORATION

(A SUBSIDIARY OF RECONSTRUCTION FINANCE CORPORATION)

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DIAMOND SODA ASH

SODIUM CARBONATE

Na_2CO_3

An indispensable ingredient
in the manufacture
of many products
Serves American Industry
in hundreds of applications

ALKALI

DIAMOND ALKALI COMPANY
Pittsburgh, Pa. and everywhere

OXALATES

Ammonium Oxalate

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Iron Oxalate

Iron and Ammonium Oxalate

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PFIZER *Manufacturing Chemists Since 1849*

WORLD'S LARGEST PRODUCER OF SYNTHETIC RESINS

RCI

GREAT NEWS

New "G" Series BECKOSOLS alleviate Alkyd Shortage

prove perfect replacements for scarce glycerine-base resins!

FROM THE CENTER OF RESIN RESEARCH

RCI experience proves its worth again with an answer to the current scarcity of glycerine and the consequent shortage of many essential alkyd resins. The new "G" series Beckosols—now available in quantity—require little change in your formulation methods yet are equal or superior to the glycerine-base Beckosols they replace. The new No. 1307-G Beckosol, for example, is fully equal in gloss, flexibility, adhesion, mineral spirits tolerance and water and gasoline resistance to scarce No. 1307 Beckosol and definitely superior in hardness. Remember—these new "G" Beckosols are not substitutes, but fully satisfactory replacements. Get the facts and get back into full production.

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General Offices and Main Plant, Detroit 20, Michigan

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SYNTHETIC RESINS • CHEMICAL COLORS • PHENOLIC PLASTICS • INDUSTRIAL CHEMICALS

specify

STANDARD

SILICATE OF SODA
Concrete Special

SILICATE OF SODA GLASS

LIQUID SILICATE OF SODA
All Grades

WATER WHITE GRADE 42

SODIUM METASILICATE

SODIUM ORTHOSILICATE

SODIUM SUPERSILICATE

ALKALATE METALATE
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The complete line of Standard Silicates includes grades and types for every class of service. Made under exacting control of manufacturing operations, Standard Silicates are dependable and uniform.

For the benefit of users of silicates, we offer the service of our Technical Staff. Experienced in the many fields in which silicates are used, these experts will gladly help you work out your problems, or assist you in getting full value from your supplies of sodium silicates.

ALKALI

DIAMOND ALKALI COMPANY • Standard Silicate Division

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General Offices • PITTSBURGH, PA.

Announcing

INDOIL
CHEMICAL PRODUCTS

Research Chemicals
ALKANE SULFONIC ACIDS

A new Series — Interesting in both the Organic and Inorganic Fields

Available only in research quantities—potentially available commercially.

THE ALKANE SULFONIC ACIDS

Are strong, stable acids, non-reactive with paraffinic and aromatic hydrocarbons. Are effective but milder catalysts than sulfuric acid in typical reactions. Form many interesting organic derivatives. Form metal salts characterized by high water solubility, including those of lead and barium.

TYPICAL PROPERTIES

	Methane Sulfonic Acid	Ethane Sulfonic Acid	Mixed Alkane Sulfonic Acids
Molecular Weight	96	110	110-120
pH of 1% Solution	1.05	1.10	1.15
Solubility of Lead Salt (g./100 g. aq. soln.)	59.2	67.3	——
Color	Yellow	Light Amber	Amber

Available in ½ and 1 pound packages, prices on request. Methane and ethane sulfonic acids are in limited supply—mixed acids available in larger quantities.

AVAILABLE COMMERCIALLY
Aliphatic Hydrocarbons
High Boiling Aromatics
Petroleum Sulfonates
Rubber Plasticizers
Polybutenes

For further information send for Bulletin No. 11 and for price list.

STANDARD OIL COMPANY (INDIANA)
CHEMICAL PRODUCTS DEPARTMENT
910 SO. MICHIGAN AVENUE, CHICAGO 80, ILLINOIS

Producers of

SULPHUR

Large stocks carried at all times,

permitting prompt shipments . . .

Uniformly high purity of 99½%

or better . . . Free of arsenic,

selenium and tellurium.

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TEXAS GULF SULPHUR CO. INC.

75 E. 45th Street New York 17, N.Y.

Mine: Newgulf, Texas

FACTS ABOUT SHARPLES MONOETHYLAMINE

$C_2 H_5 NH_2$

IT IS:

- the lowest priced alkylamine on the market.
- immediately available in virtually unlimited quantity.
- produced by a controlled process, assuring uniformly high quality.
- a versatile compound of potential value as a reactant or solvent for many processes.

SPECIFICATIONS

(70% Aqueous Solution)

Color	Water-white
Specific Gravity at 20°/20° C.	0.79-0.80
Water Insolubles	None
Minimum Ethylamine Content	70%

PROPERTIES

(70% Aqueous Solution)

Flash Point (open cup)	Below 0° F.
Average Weight per gallon	6.63 lbs.
Boiling Point (Anhydrous)	16.6° C.
Freezing Point (Anhydrous)	−80.6° C.

Many processes involving the use of Monoethylamine as a solvent or reactant were formerly economically impractical and should be reconsidered in light of the low prices now in effect. The more important uses, as well as those suggested in the technical literature, are given below as an aid in adapting this amine for utilization in various industries.

PRESENT AND SUGGESTED USES

Petroleum: Solvent extraction; preparation of amides useful in refining of lubricating oil; complex salt with CuCl useful for recovery of diolefins; intermediate for preparation of demulsifier.

Solvent: Selective solvent in petroleum and vegetable oil refining; solvent for wide range of organic compounds.

Textiles: Intermediate for synthesis of surface active agents, dyestuffs and sizing compounds.

Emulsions: Fatty acid soaps as emulsifying agents for self polishing waxes.

Rubber: Synthesis of vulcanization accelerators; stabilizer for latex.

Plastics: Condensing agent for urea-formaldehyde molding mixtures; preparation of various nitrogen ethylated amides which are useful as plasticizers; condensation products with other resin forming materials useful as moldings, coatings, adhesives and sizing compounds.

Ceramics: Deflocculating agent for increasing strength of clay bodies.

Pharmaceuticals: Synthesis of medicinals.

Photography: Synthesis of photographic dyes.

Samples and further information will be supplied gladly upon request.

SHARPLES CHEMICALS INC.

SHARPLES TRADE MARK CHEMICALS

PHILADELPHIA • CHICAGO • NEW YORK

SHARPLES SYNTHETIC ORGANIC CHEMICALS

PENTASOL* (AMYL ALCOHOLS)
PENT-ACETATE* (AMYL ACETATE)
PENTALARM* (AMYL MERCAPTAN)

BURAMINE* (BUTYL UREA, Tech.)
PENTAPHEN* (p-tert-AMYL PHENOL)
VULTACS* (ALKYL PHENOL SULFIDES)

PENTALENES* (AMYL NAPHTHALENES)

AMYLAMINE
DIAMYLAMINE
TRIAMYLAMINE

ETHYLAMINE
DIETHYLAMINE
TRIETHYLAMINE

BUTYLAMINE
DIBUTYLAMINE
TRIBUTYLAMINE

DIETHYLAMINOETHANOL
ETHYL MONOETHANOLAMINE
ETHYL DIETHANOLAMINE
MIXED ETHYL ETHANOLAMINES
DIBUTYLAMINOETHANOL
BUTYL MONOETHANOLAMINE
BUTYL DIETHANOLAMINE
MIXED BUTYL ETHANOLAMINES

TETRAETHYLTHIURAM DISULFIDE
TETRAETHYLTHIURAM MONOSULFIDE
TETRAMETHYLTHIURAM DISULFIDE
ZINC DIETHYLDITHIOCARBAMATE
ZINC DIMETHYLDITHIOCARBAMATE
ZINC DIBUTYLDITHIOCARBAMATE
CUPRIC DIETHYLDITHIOCARBAMATE
SELENIUM DIETHYLDITHIOCARBAMATE

AMYL CHLORIDES
DICHLORO PENTANES

o-AMYL PHENOL
DIAMYL PHENOL
DIAMYLPHENOXY ETHANOL

MIXED AMYLENES
AMYL SULFIDE

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SHARPLES CHEMICALS INC.

EXECUTIVE OFFICES: PHILADELPHIA, PA.
PLANT: WYANDOTTE, MICH.

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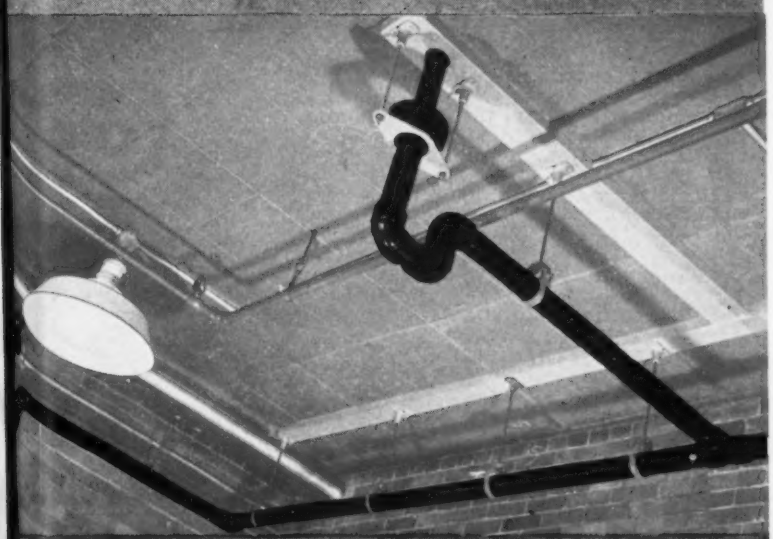
New York — Chicago — Salt Lake City

West Coast: MARTIN, HOYT & MILNE, INC., Los Angeles . . San Francisco . . Seattle
Canada: SHAWINIGAN CHEMICALS LTD., Montreal, Quebec
Export: AIRCO EXPORT CORP., New York City

SARAN PIPE at work

Interior of an Oliver Filter, showing an installation of Saran pipe and multiple welds. These filters are used in the manufacture of salt and other crystalline materials.



These Saran drain lines from a chemical laboratory replaced vitrified tile.

in the CHEMICAL INDUSTRIES

Characteristics of this thermoplastic pipe approach the ideal in many applications for piping oils, chemicals and other liquids. Tough, durable, chemical resistant and light in weight, it has proven eminently successful in both new construction and replacement. Available in all standard diameters up to four inches, it can be erected with accompanying plastic fittings or with any other fittings, old or new. This makes for fast and economical erection as well as easy maintenance and replacement.

SEND FOR CATALOG AND PRICE LIST

Our engineering department can be very helpful to you in deciding upon the merit of Saran pipe in its possible applications in your plant. They have had long experience in this work and will save you many hours of guessing and figuring. Ask us to send one of our engineers to see you. No obligation.

COMMERCIAL PLASTICS CO.

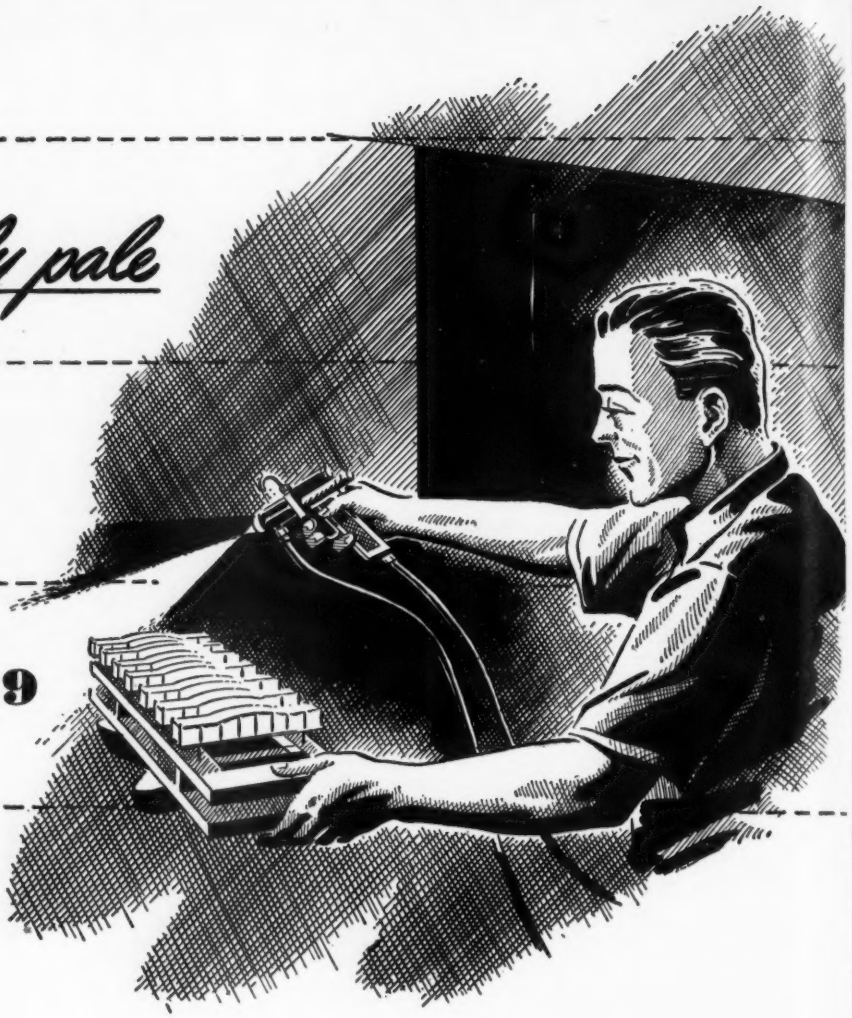
201 NORTH WELLS STREET • CHICAGO 6, ILLINOIS

Now...

an exceptionally pale

maleic resin

AROCHEM 519



Immediately available without restrictions, Arochem 519 is an exceptionally pale lacquer and varnish resin having excellent color retention as well as very rapid solvent release. A modified maleic, it is especially suited for use in sanding sealers, finishing lacquers, lacquer enamels, general utility lacquers, tin decorating varnishes and enamels, and a general line of air-drying or baking finishes. White enamels based on this resin show little after-yellowing . . . retain their original luster even after extended exposure.

Two similar resins of long established use — Arochem 520 and Arochem 545 — possess the same general properties as Arochem 519. Arochem 520 is not quite as pale as 519, while Arochem 545 is designed for extreme hardness and color retention. They are also readily available.

For samples or further data, phone or write U. S. Industrial Chemicals, Inc.

Specifications

	AROCHEM 519	AROCHEM 520	AROCHEM 545
Acid number	25-35	25-35	25-35
Melting point	140°-145°C	140°-145°C	145°-150°C
Color (G.H.1933)	5-7	7-9	8-10
Specific gravity	1.1	1.1	1.1

U.S. INDUSTRIAL CHEMICALS, INC.

60 East 42nd Street, New York 17, N. Y.

monsanto pharmaceuticals

SACCHARIN, U.S.P.
GLYCERO-PHOSPHATES
SODIUM BENZOATE, U.S.P.
SODIUM PHOSPHATE, DI
METHYL SALICYLATE, U.S.P.
FERRIC PHOSPHATES
CHLORAL HYDRATE, U.S.P.
CAFFEINE, U.S.P.
PHENOL, U.S.P.
BENZOIC ACID, U.S.P.
MAGNESIUM PHOSPHATES
SALICYLIC ACID, U.S.P.
PHENOLPHTHALEIN, U.S.P.
CHLORAMINE-T, U.S.P.
PHOSPHORIC ACID
CALCIUM PHOSPHATE, DI
ACETYL SALICYLIC ACID (ASPIRIN)
ACETOPHENETIDIN, U.S.P.
POTASSIUM AMMONIUM PHOSPHATE
SODIUM SALICYLATE, U.S.P.
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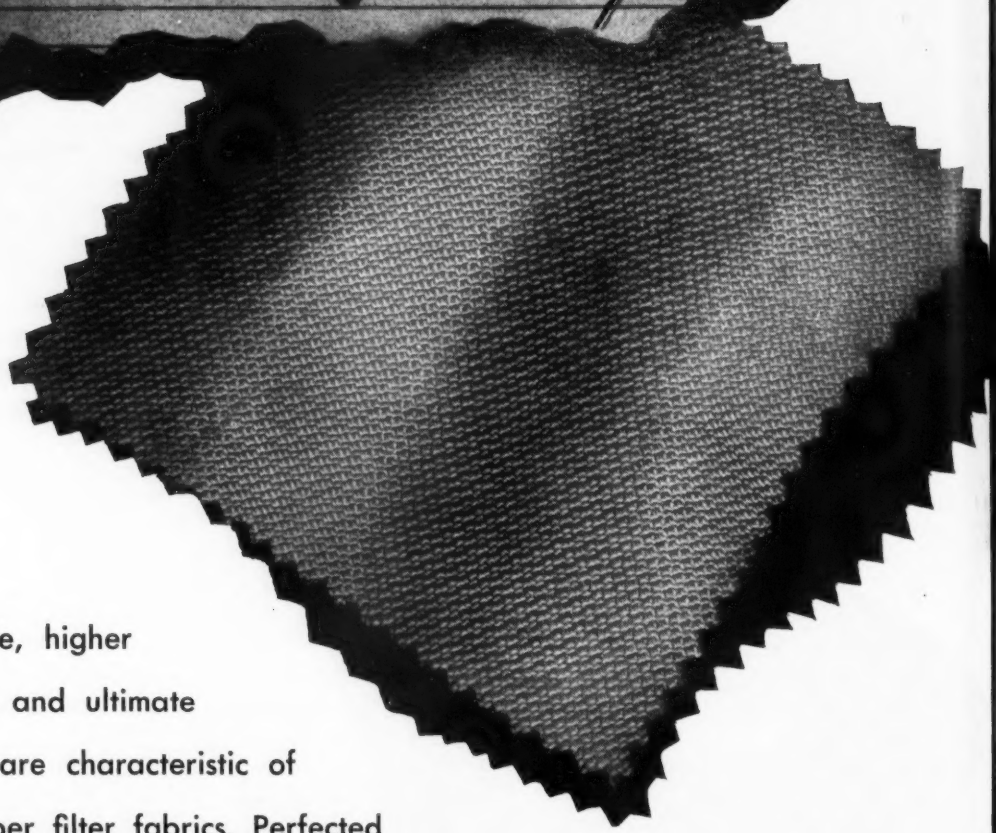
SALOL (PHENYL SALICYLATE)

Because human welfare depends so much on the purity of pharmaceuticals, Monsanto technicians constantly exercise every conceivable precaution in the many stages of research, testing and control through which Monsanto products pass . . . Technical service available. Contact the nearest Monsanto Office, or write: MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri. District Offices in: New York, Chicago, Boston, Detroit, Cincinnati, Charlotte, Birmingham, Los Angeles, San Francisco, Seattle, Montreal, Toronto.

MONSANTO CHEMICALS
SERVING INDUSTRY . . . WHICH SERVES MANKIND

Vinyon* may be your answer for filtration of corrosive fluids



Longer life, higher efficiency, and ultimate economy are characteristic of Vinyon fiber filter fabrics. Perfected and developed through careful field studies Vinyon fabrics are now solving many problems in the filtration of mineral acid and alkali solutions. Subject always to certain heat limitations, Vinyon is highly resistant to corrosive fluids. We'll gladly discuss Vinyon's application to your filtration problems.

*Reg. Trade Mark C & C.C.C.

WELLINGTON SEARS COMPANY

SELLING AGENTS

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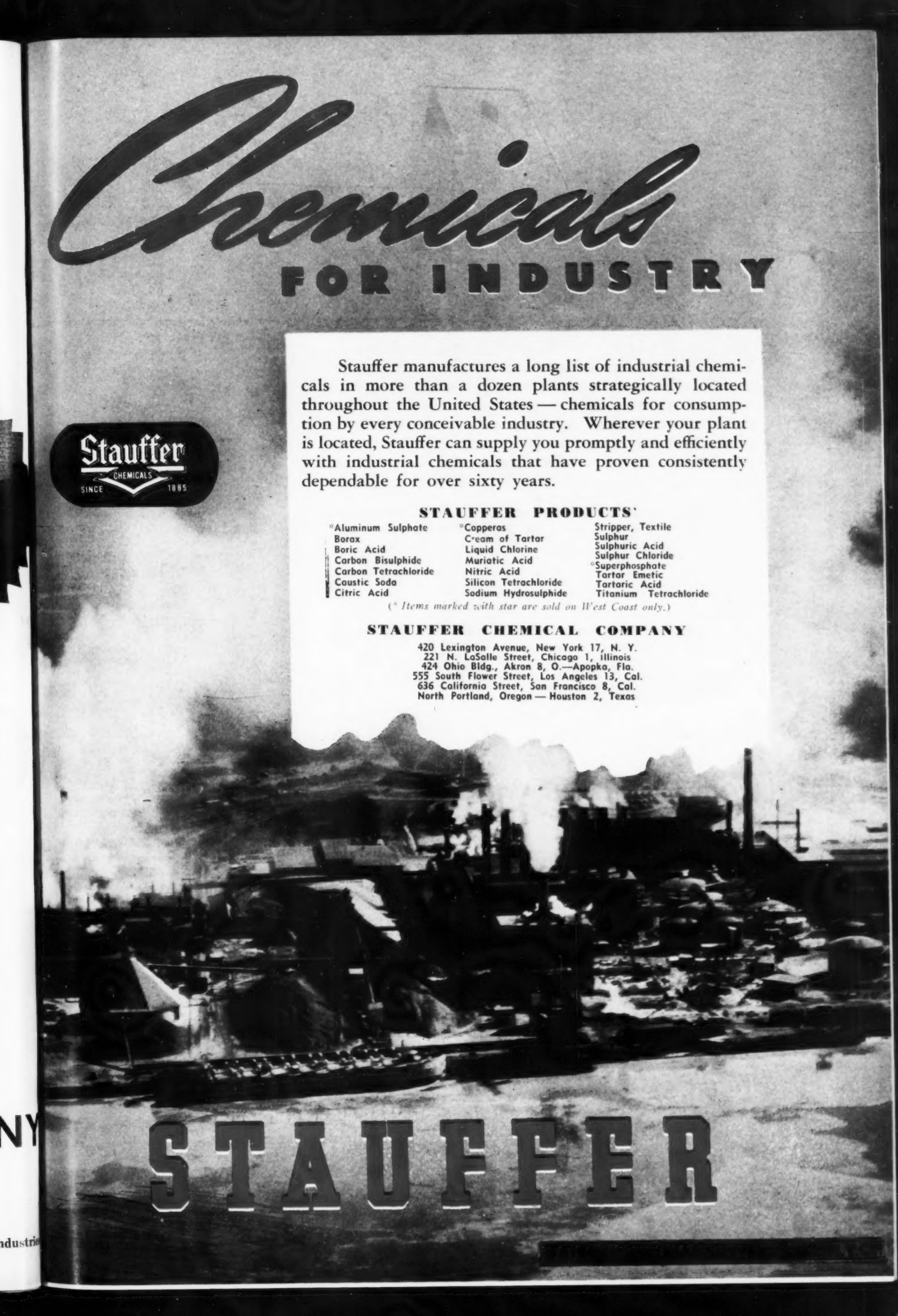
Chemicals
FOR INDUSTRY
Stauffer
CHEMICALS
SINCE 1885
Stauffer manufactures a long list of industrial chemicals in more than a dozen plants strategically located throughout the United States — chemicals for consumption by every conceivable industry. Wherever your plant is located, Stauffer can supply you promptly and efficiently with industrial chemicals that have proven consistently dependable for over sixty years.
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Muriatic Acid
Nitric Acid
Silicon Tetrachloride
Sodium Hydrosulphide
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Sulphur
Sulphuric Acid
Sulphur Chloride
*Superphosphate
Tartar Emetic
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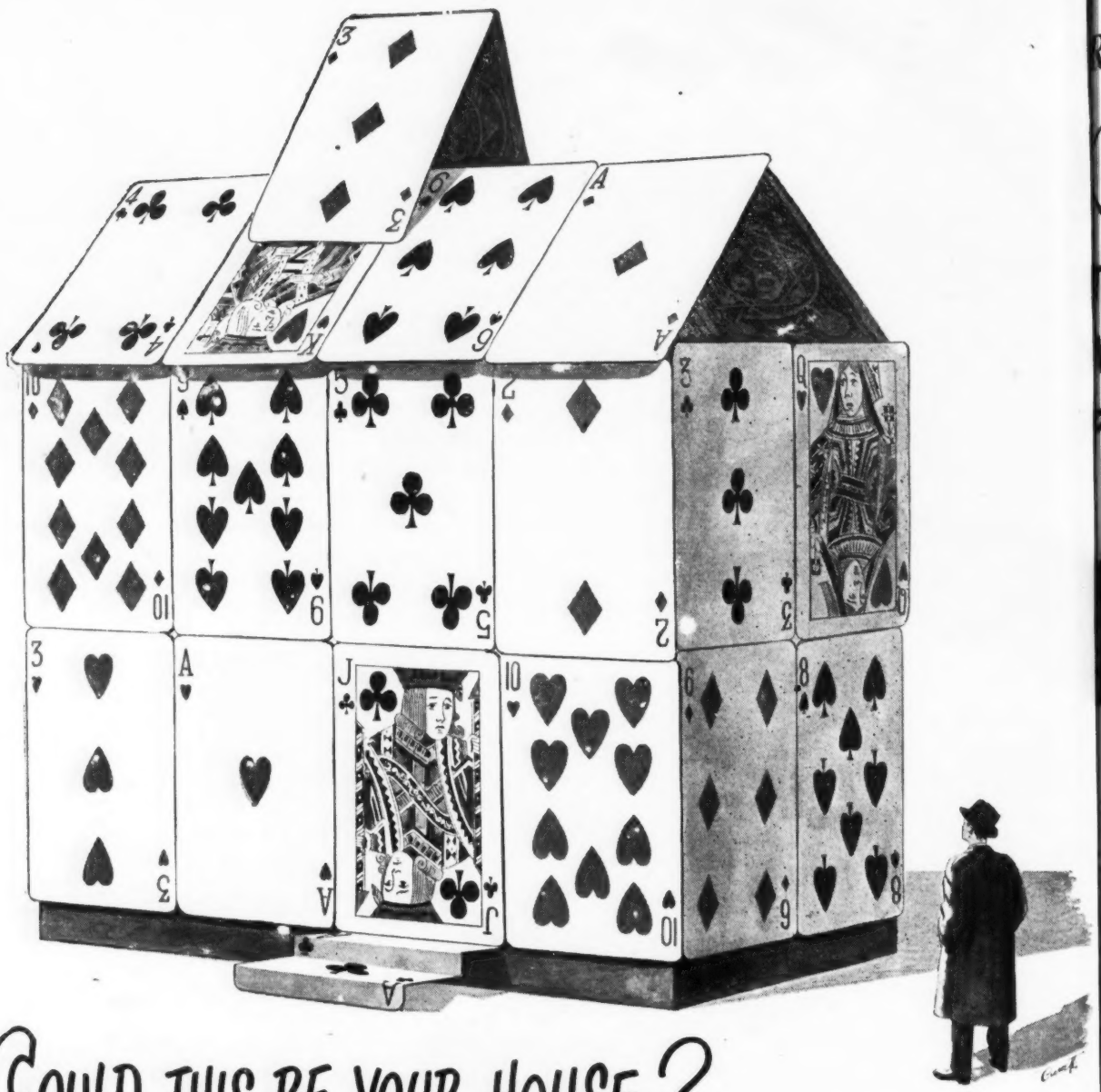
555 South Flower Street, Los Angeles 13, Cal.
636 California Street, San Francisco 8, Cal.
North Portland, Oregon — Houston 2, Texas
STAUFFER



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Now that the war's over and a lot more civilian goods are on the market, it's a big temptation to spend just about all you make, and not put anything aside.

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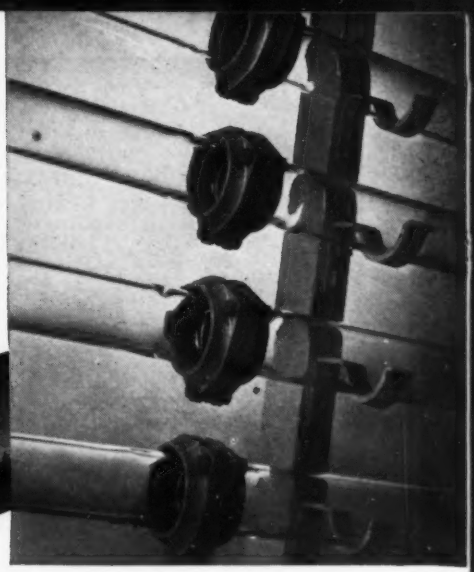

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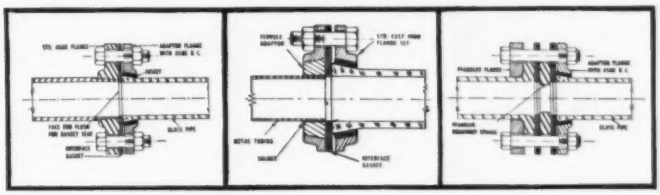

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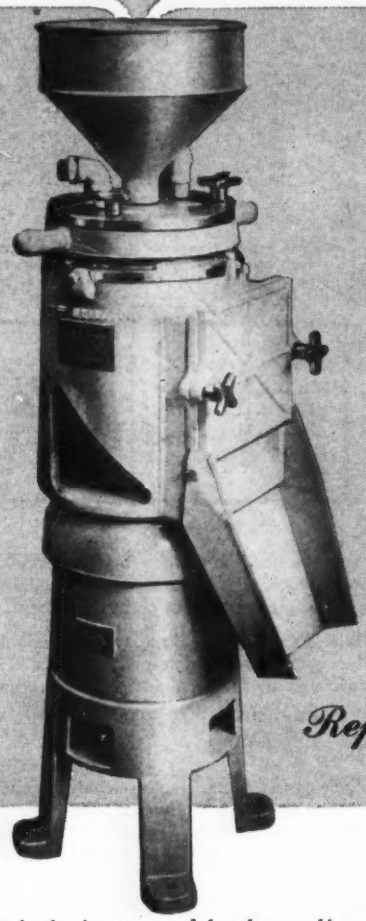

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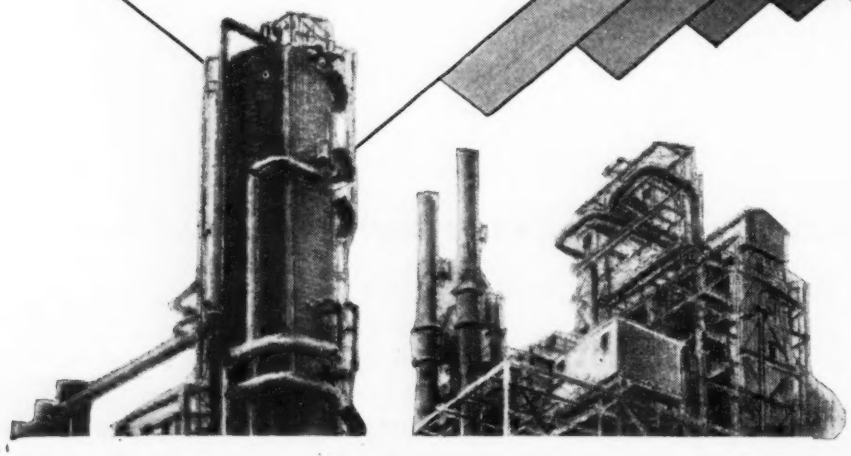

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CHLORINE, Cl_2, readily enters into addition and substitution reactions with many types of organic compounds. With aromatic hydrocarbons chlorine is widely used for the chlorination of both side chains and nucleus of the compound by the use of the proper catalyst. Chlorine is also widely used in reactions with acetic acid, nitro compounds, sulfonic acids, esters and ethers. Hooker Liquid Chlorine made in the Hooker "S" cell conforms to the high standards of the industry.

HYDROGEN CHLORIDE, HCl, the anhydrous gas is used to form alkyl chlorides through reaction with alcohols, ethers and unsaturated hydrocarbons. It reacts with organic acid anhydrides to form acid chlorides. Hydrogen Chloride may combine with vinyl chloride, ethylene, and rubber to form many important compounds. Hooker Hydrogen Chloride is supplied in an aqueous solution as muriatic acid or it may be synthesized from hydrogen and chlorine under licensing arrangements with us.

SULFURYL CHLORIDE, SO_2Cl_2, is commonly used to form organic acid chlorides. It may be used to produce chlor derivatives of phenols and in the presence of certain catalysts to produce chlor derivatives of hydrocarbons or the sulfonyl chlorides of hydrocarbons.

THIONYL CHLORIDE, $SOCl_2$, available in a high degree of purity is a popular chlorinating agent because by-products of its reactions are sulfur dioxide and hydrogen chloride, gases readily removed by heating. It reacts with organic acids to form either acid chlorides or anhydrides depending upon ratio of acid to Thionyl Chloride.

SULFUR DICHLORIDE, SCl_2, is used as a chlorinating agent and in these reactions may be considered the equivalent of chlorine dissolved in sulfur monochloride. It reacts with sodium salts of organic acids to produce acid anhydrides.

SULFUR MONOCHLORIDE, S_2Cl_2, and SULFUR DICHLORIDE, SCl_2, are used in metallurgy to chloridize sulfide ores. They react with unsaturated hydrocarbons introducing sulfur or chlorine, or both in the molecule. Unsaturated fatty acids are treated with these chlorides to produce cutting oil bases. They also find extensive use in the manufacture of dye intermediates, rubber substitutes, military gases, insecticides, and pharmaceuticals. Phenolic resins can be made through the use of these chlorides. The sulfur chlorides which have a ready source of chlorine are ideal chlorinating agents with the added advantages of low cost, ease of handling and storage.

PHOSGENE (Carbonyl Chloride), $COCl_2$, is the acid chloride of carbonic acid. With alcohols it forms either chlorformates or carbonates. With amines it forms chloramides, substituted ureas or isocyanates. It enters into many Friedel-Crafts syntheses with aromatics to produce acid chlorides or aryl ketones. It may also act as an agent for direct chlorination. With metallic oxides and sulfides, it gives anhydrous chlorides. Reacting with organic acids it has been used to make acid chlorides and anhydrides.

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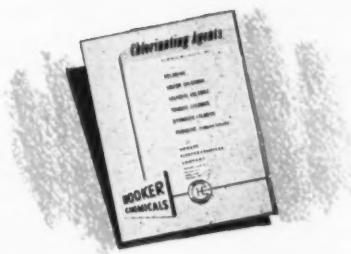

BULLETIN No. 328A, a technical discussion on Hooker Chlorinating Agents, gives more information on these chlorinating agents and is available upon request. Our technical staff is also at your service in helping to solve problems involving the introduction of chlorine into organic chemicals or in the application of any of the many Hooker chemicals.

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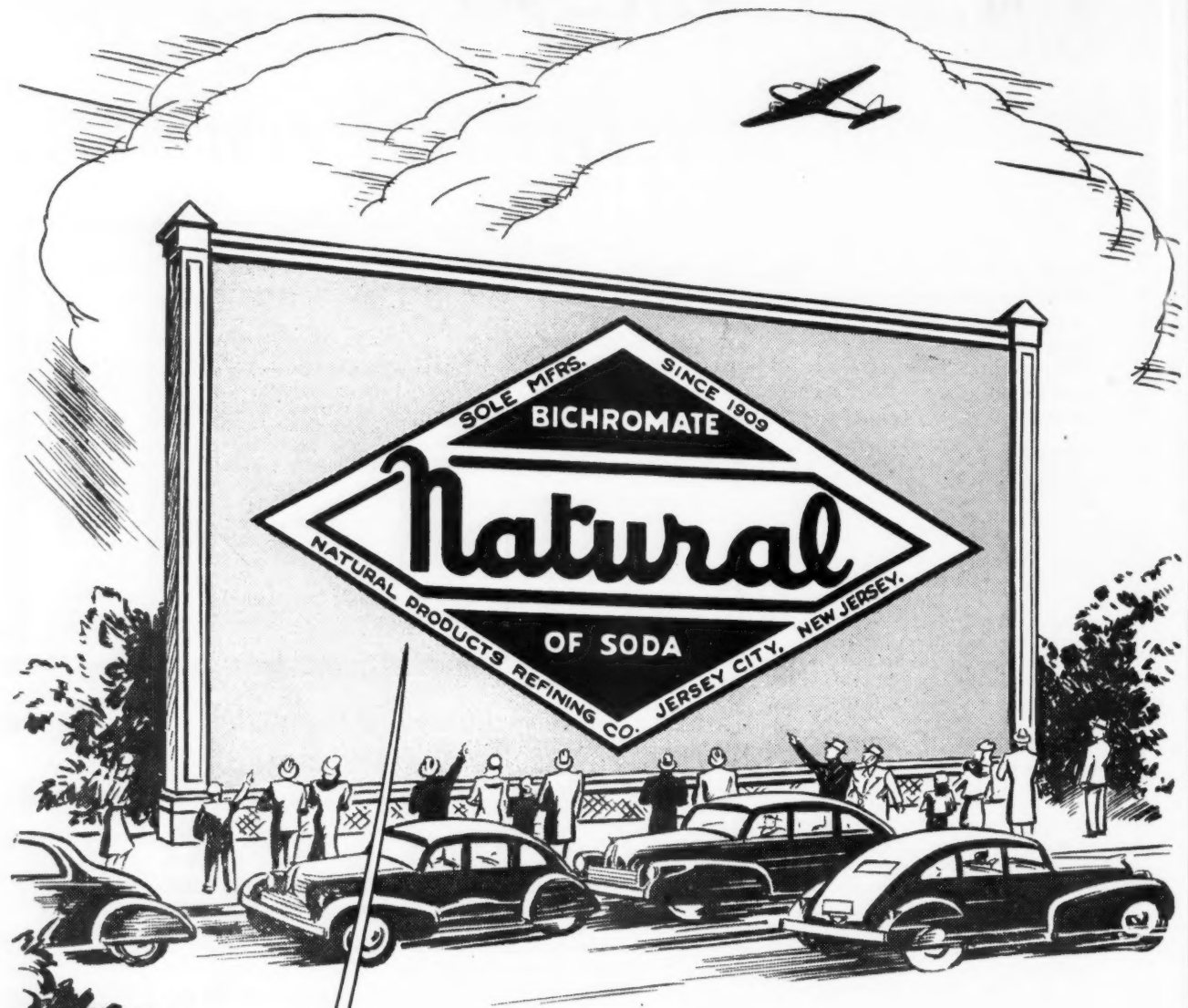

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Kilgore Compromise

by ROBERT L. TAYLOR, editor

THE NEW KILGORE-MAGNUSON compromise bill S. 1850, latest in the parade of National Science Foundation bills, somehow brings to mind a remark made by a representative of one of the parties to a union contract that was up for negotiation. "We want to be reasonable about this," said the representative. "As long as we think we're right, we'll fight to the finish. But if you can show us where we're wrong, we'll be glad to compromise."

S. 1850 is the first of the science bills to be sponsored by and have the support of both Senators Kilgore and Magnuson, and it is also reported that backing has been obtained from the Committee Supporting the Bush Report, which previously had taken the lead in the majority support of Senator Magnuson's earlier S. 1285 as opposed to Senator Kilgore's S. 1297. These two earlier bills, it will be recalled, proposed similar programs but differed significantly in provisions for their administration.

Of the earlier bills, both of which provided for a National Science Foundation, S. 1285 (Magnuson) followed the recommendations of the Bush Report and specified that the Foundation be run by an Administrator appointed by and responsible to a board of Presidentially-appointed, part-time scientists, which in turn would be responsible to the President and Congress. S. 1297 (Kilgore), on the other hand, placed top authority and responsibility in the Administrator, who was to be appointed by and responsible to the President directly, with the Board serving in an advisory capacity only.

In an effort at compromise, the new bill, S. 1850, retains the Kilgore method of organization but presumably superimposes on this a system of checks and balances which are supposed to keep the Administrator within bounds and give greater voice to the Board. This is accomplished by requiring that the President, before appointing an Administrator, "consult with and receive the recommendations of the Board," and that both the Administrator and the Board submit separate annual reports to the President and Congress which shall include "independent recommendations concerning the budget, organization, and management of the foundation, and such other recommendations (as may be deemed necessary) to better effectuate the purposes of the Act."

While the new bill has been called a compromise, it actually offers little more than a clearer definition of the powers of the Board which were implied but not specifically stated in earlier Kilgore bills. The Board still has no authority. That is in the hands of the Administrator and the President. While it is now specifically stated that the Board shall lay its recommendations before the President as well as the Administrator, there was nothing to prevent its doing the same under S. 1297. Now, as then, it can exert authority over the Administrator only by going through the President or the Congress. Actually, the present bill has accomplished nothing with respect to increasing the Board's authority over that provided in previous Kilgore bills. On the other hand it completely strips the Board of the authority it was given in the Magnuson Bill.

This is hardly a compromise. As a matter of fact, it is doubtful if a real compromise on the issue of authority is either possible or desirable. In any Board-Administrator relationship that could possibly be set up, either one or the other must have the greater authority and responsibility or controversial issues must be taken to the President for a decision, which only throws still greater ultimate power to the President's office.

In a letter to President Truman dated November 24, 1945, the members of the Committee Supporting the Bush Report said,

"In our opinion it would be most unwise to subordinate the board to a single director appointed by the President, as is done in the Kilgore Bill. No single person, however eminent or competent, could, except in great emergency, command the confidence and support of all branches of science and of the many organizations and agencies, private and public, whose cooperation will be required. A subordinated board—a board without ultimate responsibility—would be, or would tend to become, a weak board.

"The board should be responsible for the appointment and supervision of the chief administrative officer, who should look after internal affairs, as provided in the Magnuson Bill. The administrator should not be in a position to dictate or interfere with the activities either of the board itself or of the professional committees appointed by the board; he should be the agent —not the master—of the board."

Judging by the testimony presented during hearings

on the two earlier bills, the above sentiments are shared by a clear majority of scientists and industrialists interested in this legislation. We do not believe S. 1850 is the Bill that this majority wants. We strongly urge that members of the chemical industry study the new bill for themselves and not be misled by the compromise label that has been attached to it. Any science legislation that is finally passed is likely to have important and lasting effects on American science and industry, and it behooves us to see that it is the best that can possibly be devised.

What is Our Duty?

ALL OF US IN THE CHEMICAL INDUSTRY, whether we are scientists, executives, salesmen or editors, are occupied to some extent by the products of science. We are in a better position than most to evaluate and appreciate the benefits to the material life of man which are the fruits of scientific endeavor.

On the other hand, we look about us and see the awful results of misdirected science—homes shattered by V-bombs, cities annihilated by atomic energy, gangsters with tommy guns, and countless other examples of "scientific" brutality—and the people cry "Let's get rid of science and the scientists!"

What is our duty as men engaged in, or gaining our livelihood from science? Shall we destroy our uranium and agree no longer to pursue the terrible potentialities of nuclear fission? Editorials in the popular press point an accusing finger at scientists, telling them that they should do this or that and that the whole affair is their responsibility.

We contend that scientists are responsible as citizens, but not beyond that. A carpenter, for example, is hired to erect a building: Is it his affair whether it is rented to the Salvation Army or to the German-American Bund? As a citizen, yes; as the carpenter who built the structure, no.

Furthermore, a man who is skilled in some specialized branch of knowledge is not qualified, by virtue of that skill, to speak with authority on issues beyond his province. A scientist is not *ipso facto* a statesman. Let us not allow any technical man or group of men, then, to speak for the rest of us in attempts to wield authority by implying that they speak for science.

Scientists have furnished the tools of war—in many cases unwittingly. Their only concern as scientists is with truth; and as scientists they have neither the responsibility nor the privilege of deciding whether that truth will be channeled into benefits or perverted into evils. The final disposition of their discoveries is a burdent of responsibility which weighs equally on all men.—H. C. E. J.

Research Meetings

TWO MAJOR CHEMICAL COMPANIES—Wyandotte and General Aniline—held meetings of their research men during the past month of the type ordinarily reserved for salesmen. The purpose of the meetings was to bring into proper focus for these technologists the part which their work plays in the overall functioning of the corporation. Top executives outlined for the men the commercial position held by the company in the chemical industry and in the nation's economy, described methods employed in the marketing of new products, reviewed the status of new projects, and sketched future plans—both broad objectives and specific programs.

Many companies would find the adoption of a similar policy profitable. The importance of the sales conference, to bolster enthusiasm, and to ensure that sales personnel are kept in close touch with the firm's present competitive position and ultimate objectives, has long been recognized. From it many dividends accrue.

It is equally desirable that research men—who are really charged with charting the future course of the company's products—likewise be acquainted with general policy and direction of company planning.—W. A. J.

Junior Technical Personnel

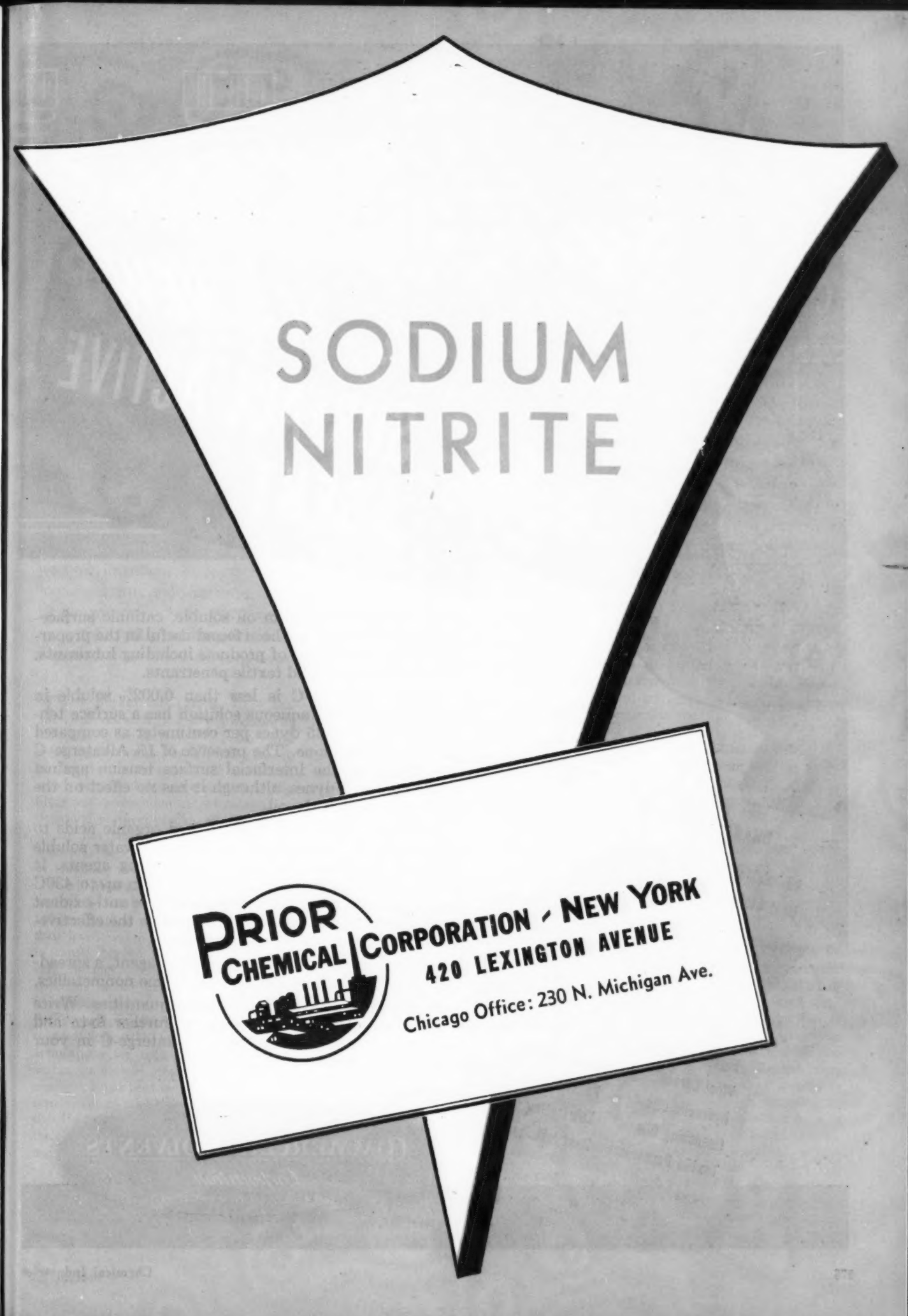
AT A RECENT MEETING OF THE Junior Activities Committee of the American Institute of Chemical Engineers, note was made of the existence "of a feeling of bewilderment and a sense of unimportance" among many of the younger members of the chemical engineering profession.

An interesting commentary and a word of hope that this problem is gradually solving itself is contained in the comments of a manager of the research laboratories of a major petroleum company. He noted that ten years ago his laboratories employed two technical men for each non-technical man; five years ago this ratio was one-to-one, and today there are two non-technical men employed for each man with technical training. He further added that it was his hope that the ratio of non-technical men to technical men would continue to increase in order to utilize the talents of the technical personnel more fully.

It will be pointed out by many that this is a by-product of the war situation, and certainly it has accelerated the trend. However, for the years 1936-1941, which represent the first half of the period covered, such comment does not apply.

Another grievance of those just beginning their professional work was against what they believe to be an excessive amount of time spent at "unpleasant" work. In this connection it was noted by the same manager of laboratories that when this period of work was eliminated by his company the results were so unsatisfactory that it was necessary to reinstate it. Now, however, he takes special pains to explain to each man the reason for this part of his training and to advise him at the start what period of time will be involved.

Such enlightened policies will go far to alleviate much of the distrust of management that is held by some of the younger members of the profession.—H. W. Z.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APRIL, 1946

BOYKIN BILL Defines War-Lost PATENT RIGHTS

by MAURICE W. LEVY, Patent Attorney
Hoffman-LaRoche, Inc., Nutley, N. J.

The Boykin Bill (H. R. 5223) has been drafted to define the means by which wartime inventions made in the United States may be transformed into foreign patents and vice versa for those cases where the exigencies of war have interfered with the customary procedure. Here the author highlights the more important provisions of the bill as it now stands, passed by the House of Representatives and under consideration by the Senate Committee on Patents.

THE Boykin Bill (H. R. 5223) has been drawn up to relieve inventors of hardships in connection with patents and patent applications. An essential purpose of the Act is to extend the period in which certain necessary acts such as the filing and prosecution of patent applications and payment of fees, whose normal course has been interfered with by the war, may be completed for the purpose of obtaining a valid patent.

World War II has prevented American inventors, who filed an application for patents in this country, from protecting their inventions in foreign countries. Due to causes beyond their control, such as ship sinkings, secrecy requirements, restrictions on the export of technical information, service with the military, or engagement in war activities, inventors found it impossible to file corresponding applications for their inventions abroad within the periods prescribed by law. For example, it has been impossible for American inventors who have been ordered by the United States Government to keep their invention secret, to file corresponding foreign applications.

The priority period, as defined by the International Convention for the Protection of Industrial Property (Sec. 4887 of the Revised Statutes), has, therefore, been lost through no fault of the inventors. This loss has involved in many cases a forfeiture of rights to obtain foreign patents. Moreover, where foreign applications had already been filed or patents obtained, American inventors found it impossible to take necessary action, such as the payment of fees or the presentation of necessary responses within times fixed, to keep patents in force. Foreign inventors, applying for patents in the United States, found their patent activities similarly circumscribed.

The following countries have already enacted laws relieving inventors from hardships owing to delays caused by the war, in connection with patents and applications for patents: Belgium, Brazil, Czechoslovakia, Denmark, France, Greece, Luxemburg, Norway, Portugal, Sweden, and Switzerland. These laws require reciprocal benefits for nationals of the involved countries. The United States does not have such reciprocal legislation at present. Accordingly, foreign countries refuse to extend the benefits of their laws to citizens of the United States until we have provided reciprocal benefits for their nationals.

During and after the first World War, legislation to prevent the loss of patent rights was enacted. Most important of such laws was that known as the Nolan Act, passed March 31, 1921. The Boykin Bill, although largely patterned after the Nolan Act, and designed for generally similar objectives, contains important additions and limitations.

Section 1 extends the priority period within which to file an application in this country after filing an antecedent foreign patent application. If priority rights had expired on September 8, 1939, or arose subsequently, the Bill would permit the filing of the domestic application at any time prior to the expiration of 12 months following the passage of the Act. Since the direct beneficiaries of this provision would for the most part, be citizens of foreign countries, the Bill requires reciprocal rights and privileges in favor of United States citizens from these foreign countries. It may be noted, parenthetically, that the date of November 8, 1939, is considered as the beginning of the war.

There are three important provisos in Section 1: First, there must be a request for an extension in writing during the pendency of the application in the Patent Office, or within 6 months after the passage of the Act. Within the times specified, a certified copy of the prior foreign application, as well as a translation thereof, if it is not in the English language, must be supplied. Second, there is a provision that no patent granted or validated by reason of an extension by virtue of the Bill shall furnish a basis of claim against the United States Government. Third, no patent granted or validated by reason of such extension will be permitted to affect the rights of others in conflicting patents or applications for patents; such other persons will not be subject to any action for infringement of the patent. It will be apparent that this

last proviso avoids retroactive effect of as much as 7 years in some cases where there have been bona fide intervening rights in or under patents or applications for patents of third parties. This last proviso does not deny a patent to a foreign inventor claiming rights under the Bill. However, a patent received by virtue of the Bill will not retroactively preclude United States citizens, corporations, or others provided for in the Bill, from exercising their rights in patents or applications for the same invention if such rights were acquired in good faith before the Bill becomes effective.

Section 2 of the Bill relates to inventions communicated prior to April 8, 1946. During the war, there was constant intercommunication between Great Britain and the United States. On August 24, 1942, an agreement was consummated with Great Britain for the interchange of patent rights, information, inventions, designs, or processes, and the like. Section 2 of the Bill provides for patent protection on a reciprocal basis for inventions which were imported into this country under this or similar agreements for utilization in the war effort. Arrangements were also in effect between the United States and other countries. The exchange of inventions between Great Britain and the United States was carried out on the understanding that the introduction of an invention in either country would not prejudice the right to a patent. This understanding was particularly essential for the protection of American inventors, for under British law the mere introduction of an invention into that country is a bar to a grant of a patent for it. The United States does not have a similar restriction in its patent laws; however, the introduction of an invention into this country followed by publication of it in a printed publication, or the public use or sale of it, for more than one year prior to the filing of a patent application therefor in this country, would be a bar to the grant of a patent in the United States. Section 2 includes specific procedure under which certain statutory restrictions cannot bar a patent. This section is particularly effective in the removal of the statutory bars of prior publication, public use, or sale.

The benefits under this section, which will primarily apply only to the United States and to Great Britain and the British Dominions, are not extended to any person unless:

1. He files an application in the Uniited States for the same invention which was communicated within 12 months from the date of the Act.

2. He furnishes in writing under Oath to the Commissioner of Patents sufficient information as to what was communicated, when and to whom, while the application is pending or within 6 months from the date of this Act. This is to enable the Commissioner of Patents to judge whether the invention communicated is identical with the invention claimed in the application, and would become part of the record.

3. The country of which the person is a national extends reciprocal privileges to our citizens.

This section of the Bill also provides for facilitating the production of evidence to prove the facts of communication of the invention for use by the Patent Office or courts.

Section 3 of the Boykin Bill is designed to avoid abandonment of applications for patent for failure to take any action or pay any fee within the times now allowed by law, whenever it is shown to the satisfaction of the Commissioner of Patents that this failure was because of conditions growing out of the war. In the United States, the fixed time now allowed by law, for instance, to file amendments or pay fees is normally six months. This section would permit the Commissioner to extend the time up to 12 months after the passage of the Act. No payment of fees for the extension is required. It applies to both United States citizens and citizens of countries granting reciprocal privileges to our citizens.

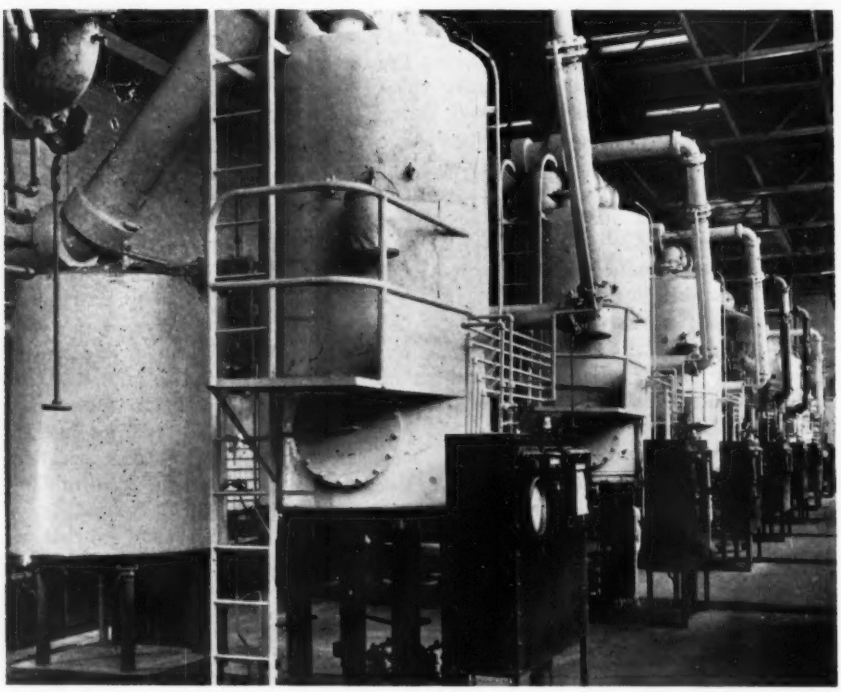
The corresponding provision in the Nolan Act did not require a showing of inability due to war conditions. Former Assistant Commissioner of Patents, Conder C. Henry, testifying as to the necessity of this provision, stated that it was designed to prevent the revival of applications abandoned deliberately or for other reasons. He stated that from January 1, 1939, to October 1, 1945, about 9,650 applications had been abandoned. If the special showing were eliminated, he believed that, in effect, many of those abandoned applications would be revived and have to be re-examined.

A proviso in this section is that nothing in the Act gives the right to reopen interference proceedings on which final hearings have been held.

Section 4 of the Bill protects the rights of the United States or of any citizen of the United States or its allies in World War II to continue or to resume any manufacture, use or sale bona fide commenced before the passage of this Act or before the other times specified.

Section 6 validates United States patents in cases where an inventor who made an invention in the United States failed to get a license from the Commissioner prior to filing his corresponding foreign application, as required by law, provided that the Commissioner subsequently issued such a license.

During the war, it was difficult to obtain the signatures of inventors to the applications for patents. Since the law requires the signature of the inventor in the formal patent application papers, many inventors would have lost the right to a patent by virtue of this inability to execute the necessary formal papers. The Commissioner of Patents adopted the policy of tentatively accepting applications signed by inventors' agents. Since there is no law at present which would legalize such applications, **Section 7** of the Bill, which had a counterpart in the Nolan Act, has been inserted for the purpose of validating applications signed by agents. Certain formalities are required under Section 7, such as the filing of papers executed by the applicants.



(Courtesy Reichhold Chemicals, Inc.)

Units for the production of phthalic anhydride via naphthalene oxidation. Because of the wording of the Nolan Act (World War I counterpart of the Boykin Bill), the basic patent, U. S. P. 1,971,888, on this process remains in effect in the United States until August 28, 1951, although the corresponding German application was filed on June 26, 1916.

An important provision of the Boykin Bill deals with the limitation of the term of a patent granted by virtue of the Act. Under **Section 10** of the Bill, the term of any patent granted under the Act is limited to 20 years from the date of filing of the first application regularly filed in any country disclosing the same invention. In no event is the patent to run for more than 17 years from the date of grant of such patent.

In this connection, it is interesting to note that after World War I a situation arose which Section 10 is designed to avoid. The Wohl patent, 1,971,888, which covers the basic process of producing phthalic anhydride by the catalytic oxidation of naphthalene in the vapor state using vanadium oxide as a catalyst, was granted in this country in 1934 under the provisions of the Nolan Act. The patent runs for 17 years and will not expire until August 28, 1951. The corresponding German application was filed on June 26, 1916. Taking advantage of the benefits of the Nolan Act, Wohl was given the benefit of his German filing date, and won an interference over a patent for the same invention issued in 1918 to two United States Department of Agriculture inventors. The first patent expired in 1935, a year after Wohl's patent issued. Under Section 10 of the Boykin Bill, the Wohl patent instead of running until 1951 would have expired in 1936, notwithstanding the fact that it was granted in 1934.

Section 9 of the Boykin Bill is important in that it can be characterized as permanent legislation and not primarily war legislation. Section 9 is designed to prohibit proof of acts done by an inventor in a foreign country. This section, however, is not applicable to persons serving with any armed force of the United States located in a foreign country.

Section 11 of the Bill precludes suits by alien enemies for infringement of their patents by the United States and its contractors during the war.

The Trading With the Enemy Act contains a provision at present permitting enemies or allies of enemies to file and prosecute United States applications for patents and to pay fees that are necessary under existing law. This particular Act also contains a provision that any enemy or ally of an enemy who is unable during war or within six months thereafter, on account of conditions arising out of war, to file a patent application, pay an official fee, or take actions required by law within prescribed periods, may be granted certain extensions within which to take necessary steps. The privilege granted by the Trading With the Enemy Act is one which is not granted to allies. Under the Boykin Bill, the extensions provided for by the Trading With the Enemy Act would be withdrawn. Treatment of the enemy would, therefore, be left for consideration in connection with the peace treaties.

An important limitation (**Section 14** of the Boykin Bill) is that benefits of the Act shall not extend in favor of the nationals of any country with which the United States shall have been at war since September 8, 1939. A similar provision is understood to be recommended in British legislation. Therefore, nationals of Germany, Hungary, Italy, Japan, Rumania, and Bulgaria would not benefit under this Act. Under the Nolan Act there was no such exclusion. Citizens of all countries, including enemy countries which granted reciprocal privileges to United States citizens, were extended its benefits. Twenty-three countries granted reciprocal provisions to United States citizens and, therefore, their citizens benefited under the Nolan Act.

The Boykin Bill was passed by the House of Representatives, on February 18, 1946, and is now before the Senate Committee on Patents.

BOYKIN BILL HIGHLIGHTS

1. Extends the time in which war-delayed patent applications may be filed in the U. S. (Sec. 1)

2. Permits revival of patent applications abandoned because of failure to take action due to wartime conditions. (Sec. 3)

3. Provides, on a reciprocal basis, that patents shall not be refused on inventions which have been communicated to the U. S. Government under an agreement with another government for use in the war effort (Sec. 2)

4. Protects the rights of a third party which may have been acquired prior to the passage of the Act. (Sec. 4)

5. Permits validation of patent applications signed by applicant's agents. (Sec. 7)

6. Prohibits proof of acts abroad, except as to members of the Armed Forces, in questions of priority of inventions. (Sec. 9)

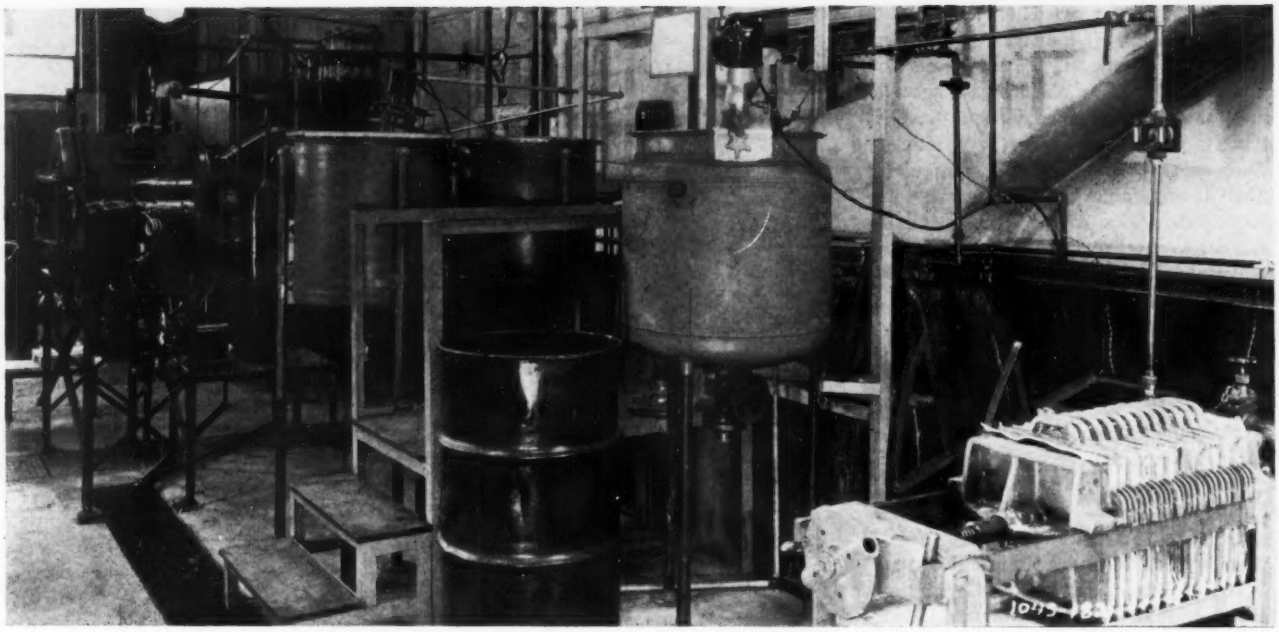
7. Protects the Government against claims under patents granted under the Act. (Sec. 1 and 2)

8. Bars claims against the U. S. Government for wartime use of enemy-held U. S. patents. (Sec. 11)

9. Denies the benefits of the Act to enemy nationals. (Sec. 14)

10. Limits the term of any patent grants under the Act to 20 years from the date of filing in a foreign country, in no case to be more than 17 years from the date of grant in this country. (Sec. 10)

11. Prevents anything in the Act from reopening patent cases where court decisions have been rendered on the validity of the patent. (Sec. 15)



General view of the pilot plant, other than the reactor. From right to left: filter press for ash removal; glass-lined tank for acidification; two extraction tanks for separation of the water soluble material; and a rotary vacuum drum dryer for removal of the final traces of solvent from the product.

ORGANIC ACIDS By Direct Oxidation of Coal

by N. W. FRANKE* AND M. W. KIEBLER*

Mellitic Associates

Carnegie Institute of Technology, Pittsburgh, Pa.

USE of elementary oxygen as the processing media for the production of useful compounds, principally polycarboxylic aromatic acids, from coal offers an entirely new approach to the age-old problem of transforming the carbon content of coal to more salable chemical materials. Here the authors bring us up to date on the present day status of this novel process.

MIXTURES of water soluble, polycarboxylic, aromatic acids are now being produced on a pilot plant scale in good yield by the controlled oxidation of bituminous coals with gaseous oxygen. The plant has been in successful operation for five months and there appear to be no serious obstacles to expansion to commercial scale as only materials and equipment in common use in the chemical industry are employed.

The product, a light yellow-brown powder, is completely soluble in water and undergoes the reactions common to organic acids. Since the acids are largely tri- and tetracarboxylic, they form hard resins even with dihydric alcohols; by reaction with monohydric alcohols high boiling esters with useful plasticizing properties can be prepared.

PROCESS

The process involves the oxidation of coal by gaseous oxygen in the presence of aqueous alkali and the recovery of the acids from the alkaline solution by acidification and solvent extraction. Finely ground coal, an alkali, such as sodium hydroxide, and water are mixed in a hopper and then pumped into a nickel-lined autoclave which is fitted with a turbo-stirrer and an internal cooling and heating coil. Steam is used to bring the system to the starting temperature where the oxygen feed is begun, and the heat of reaction is then utilized to raise the temperature to the operating point. The operating range is 200 to 300° C at total pressures from 500 to 1200 pounds per square inch. Large amounts of high temperature by-product steam are formed in the cooling coil in removing the heat of reaction.

The oxidation requires 2-3 hours. During this period all the carbonaceous material of the coal passes into solution with about half of the carbon of the coal being oxidized to organic acids and the balance to carbon dioxide. At the end of the cycle the system is cooled to about 110° C and the product is discharged to cooling tanks. The ash, which remains largely unattacked, is then removed in a conventional plate and frame filter press. Some sodium carbonate precipitates and can also be removed at this stage.

The filtered product, which is an alkaline solution containing the sodium salts of the organic acids and sodium carbonate, is then run to a glass-lined mixing tank where enough sulfuric acid is added to

* The authors are Research Associates with the Coal Research Laboratory, at the above-noted institution.

form the free acids. At this stage a small amount of dark brown insoluble acidic material appears. This is removed by filtering through a fine screen during the transfer to the extraction tanks. The extraction of the water-soluble aromatic acids from the acidified aqueous solution is done in a two-stage, countercurrent batch process carried out in glass-lined tanks. A recovery of over 95% of the acids is achieved. The extract layer is then transferred to a steam-heated glass-lined still where the bulk of the solvent is recovered. The still product, which is a syrupy liquid containing 50-70% by weight of dissolved acids, is fed to a vacuum rotary drum drier for removal of the remainder of the solvent. The dry product is then ground to a fine powder in a pebble mill.

The cost of the finished product is expected to be in the range of similar organic acids, but it will depend on several factors which have yet to be fully evaluated. The most important of these, of course, is the volume of production. If large tonnage uses are found, certain improvements such as continuous operation and reagent recovery must be further developed. However, if only small amounts are required, the present process could be used with little change other than to increase the size of the equipment. Another factor in determining cost is the purity of product required.

PRODUCT

The yield of the principal product, mixed aromatic acids, is over 60% of the weight of coal charged to the plant. This mixture of aromatic acids is a light yellow-brown powder which is very soluble in water and is quite hygroscopic. The product is strongly acid and can be easily titrated by conventional analytical procedures. The average analytical properties correspond approximately to those of a mixture of tri- and tetracarboxylic benzene acids. Undoubtedly acids having a more complex nucleus than the benzene ring are present. The nature of the acids is determined to some extent by the rank of the coal used, high rank coals yielding a larger proportion of the more highly carboxylated acids.

Although the primary purpose of this plant is to produce samples and material for investigation of the properties of the acids, yield and operating data are also being obtained. At present the plant is producing 5 to 10 pounds of finished product per day. Each stage in the pilot plant is a batch operation in order to obtain the maximum flexibility at low cost. Some of the data necessary for design of a continuous plant have already been obtained and work is continuing.

USE

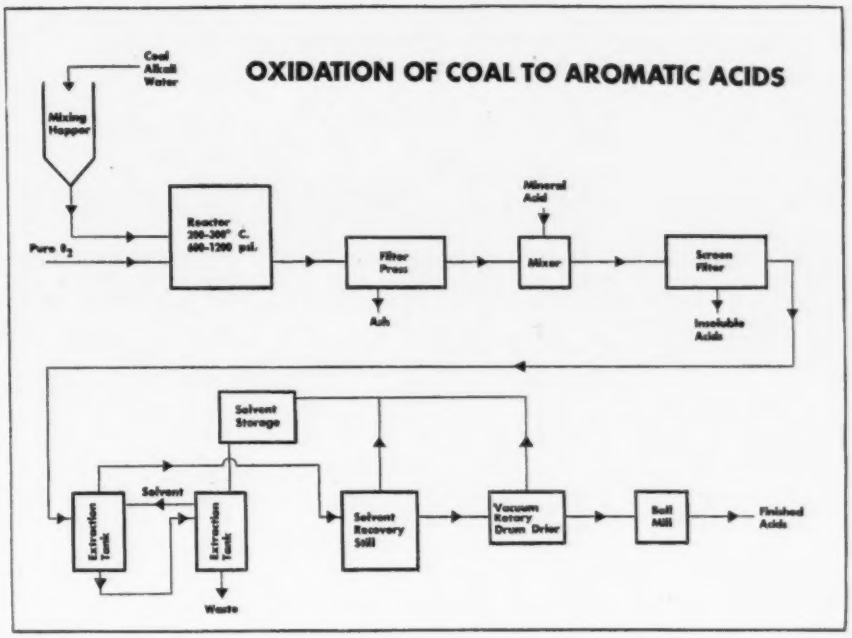
Like all polybasic acids, the product reacts with polyhydric alcohols to form polymeric resins. There is opportunity for investigation here because the additional functional groups may be modified by reaction or may give additional cross-linking. Like other carboxylic acids, they form esters with monohydric alcohols. An interesting series is formed by the normal aliphatic alcohols, the methyl ester being very tacky and nearly solid, the octyl ester oily and fluid, and the C_2-C_7 esters being intermediate in properties. Since these esters are very high boiling—less volatile than dibutyl phthalate—and insoluble in water, they should be useful as plasticizers and tackifiers. Partial esterification leaves free carboxyl groups in a hydrocarbon soluble material which should find uses in the formulation of oil additives and detergents. In addition to esters the acids form the usual compounds, such as metal and ammonium salts, acyl halides, amides, etc.

The acids are roughly 50% carbon and have an average equivalent weight of 80 and average molecular weight of 250. Less than 0.5% of the matter is volatile at room temperature and the ash is less than 0.4%. Acetic acid and oxalic acid are present in amounts up to 1%.

In addition to the aromatic acids, small amounts of several other products are formed in the process and may be recovered. The most important of these materials are oxalic acid, acetic acid and ammonia. The yields of these lesser products are much more dependent on the conditions of operation than that of the aromatic acids and the sale of these secondary products may reduce the cost of the aromatic acids appreciably.

SUMMARY

A process to produce aromatic polycarboxylic acids by the direct oxidation of coal has been developed and is operating on a pilot plant scale. All of the reactants employed are cheap and readily available and every step in the process is apparently applicable to large scale continuous production. The product, a light colored powder, is a mixture of aromatic acids, which are water-soluble and strongly acidic. They undergo the usual reactions characteristic of the carboxyl group and have, in addition, the properties peculiar to polycarboxylic acids. Many uses in fields such as general chemicals, plastics, plasticizers and starting materials for synthesis will undoubtedly be found for this entirely new product.



Reactor, drawn up from the pit in which it is placed during operation, where coal is transformed to a mixture of organic acids by elemental oxygen at high temperature and pressure.

No. 5 of a series on
INFORMATION SOURCES FOR CHEMICAL MARKET RESEARCH

DATA Available from Other DEPARTMENT OF INTERIOR AGENCIES

by RICHARD M. LAWRENCE* and LAWRENCE A. MONROE**

THE Department of the Interior, with broad responsibilities for natural resources, includes a number of agencies in whose reports and records there is a vast volume of varied information of high importance to the chemical market researcher. The best-known of these agencies, the Bureau of Mines, was discussed at length in last month's article, and this month's article considers the U. S. Geological Survey, the Bonneville Power Administration, and the Fish & Wildlife Service.

The Bureau of Mines and the Geological Survey are concerned with mineral resources. The Bonneville Power Administration conducts researches into all questions bearing on the development of its power load. The Fish & Wildlife Service develops information dealing with fish, fisheries, and fish products.

The Bureau of Mines and the Geological Survey are distinct organizations as to division of work, although coöperation between them is essential in carrying out the functions of each. For over 40 years, ending in 1923, the Geological Survey annually published Mineral Resources, the predecessor of the Bureau of Mines *Minerals Yearbook* series. Among other duties, the Geological Survey makes explorations of mineral resources, and, on finding a deposit which may have commercial significance, makes a report to the Bureau of Mines. The Bureau of Mines is then charged, among other things, with the task of making measurements and determining the commercial characteristics of the deposit. Under pressure of the war both agencies accelerated their exploration work.

GEOLOGICAL SURVEY

Established in 1879, the Geological Survey is among the oldest of the government's scientific agencies and has a long record of achievement in the application of the principles of geology to the discovery and development of mineral resources. Its scientists and engineers are continually adding to the Survey's encyclopedic information on geology, topography and water supply and, bit by bit, they have built a great mosaic picture of the nation's mineral wealth. Their extensive, systematic geologic surveys have impressively demonstrated the old adage "Research Enhances Values" in augmented mineral wealth and economic benefits. It is confidently expected that discoveries of new mineral deposits during the postwar years will materially increase the known reserve.

The director, Dr. Wm. Embry Wrather, is an eminent petroleum geologist, and a past president of both the American Association of Petroleum Geologists and the Society of Economic Geologists. His name is starred in American Men of Science, as were those of his famous predecessors, Walter Curran Mendenhall and George Otis Smith.

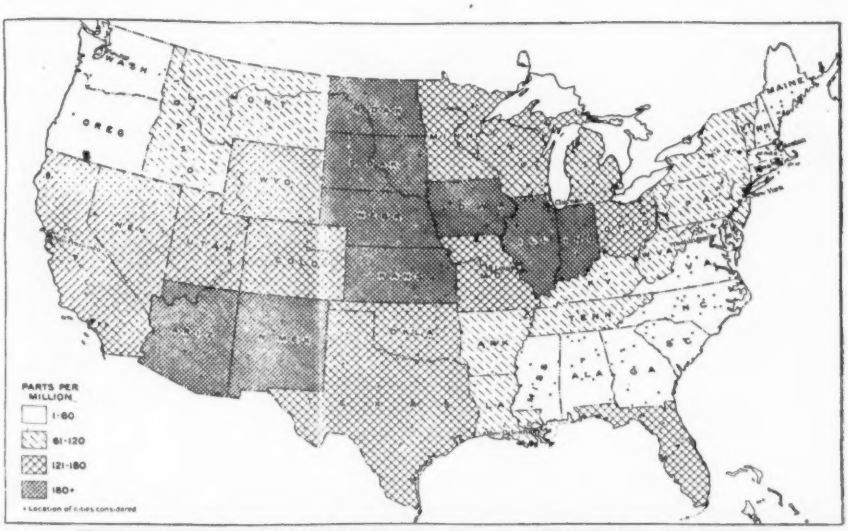
The Survey is probably best known to the general public through its topographical quadrangle maps, but industry is more closely concerned with its fundamental work on minerals and water supply. Five engineering or scientific branches carry out the technical work of the Survey:

(1) The Geologic Branch studies the geology of the United States, its territories and possessions, including distribution and reserves of mineral deposits and research in geologic and related chemical and physical problems. Wilmot H. Bradley is the Chief Geologist.

(2) The Topographic Branch is responsible for topographic surveys of the United States and Puerto Rico and preparation of maps for publication as well as engineering bulletins. Thomas P. Pendleton is the Chief Topographic Engineer.

(3) The Conservation Branch is delegated the task of classification of public lands as to their mineral and water resources and furnishing technical data for the administration of public lands. It is also responsible for supervision of operations for mineral development on public and Indian lands, and determination of output and royalty liability. Harold J. Duncan is Conservation Branch Chief.

(4) The Water Resources Branch investigates the quantity, quality, distribution, mineral content, availability, and utilization of surface and underground water supplies of the United States, and prepares the results for publication in water-supply papers. The Chief Hydraulic Engineer is Carl G. Paulson.



WEIGHTED AVERAGE HARDNESS, BY STATES, OF WATER FURNISHED IN 1940 BY PUBLIC SUPPLY SYSTEMS IN OVER 600 CITIES IN THE UNITED STATES.

The U. S. Geological Survey is the No. 1 authority on water supply. It has detailed information for plant location surveys and for market studies on soap and water treatment chemicals.

* Mr. Lawrence is connected with the Development Department, Atlas Powder Co., Wilmington, Del.; Mr. Monroe is in Washington, D. C.

** The authors acknowledge with gratitude the assistance of the government agencies listed in supplying material on which this article is based.

(5) The Alaskan Branch investigates the geology, mineral resources and mineral production of Alaska; makes topographic surveys of the Territory; and prepares resulting reports and maps for publication. The head of the Alaskan Branch is P. S. Smith, Chief Alaskan Geologist.

The U. S. Geological Survey has extensive cooperative arrangements with geological agencies of the various states and other public organizations, including its equivalent agencies in foreign countries.

Left, Dr. Paul J. Raver, Administrator, Bonneville Power Administration; right, Dr. William Embry Wrather, Director, U. S. Geological Survey. Dr. Wrather is a past president of the American Association of Petroleum Geologists.

TYPES OF INFORMATION AVAILABLE

In addition to its thousands of reports, the Geological Survey disseminates a great deal of information through correspondence and interviews and welcomes visitors to its large and specialized library in Washington.

Through the years, the Geological Survey has built up a vast accumulation of published and unpublished information concerning the mineral resources of the United States and its territories. This information was greatly expanded during the war as a result of the intensified efforts of the Survey in carrying out its strategic war assignments among which were important discoveries of 25 million dollars worth of badly needed tungsten and mercury ores. In order to guarantee supplies of certain critical minerals, exploration work has even been carried out in foreign countries.

The mineral resources of the United States constitute a collective source of chemical raw materials that is subject to greater availability and use than would be the case anywhere else in the world. The information in the hands of the Geological Survey is important to an understanding of chemical markets with respect to location, extent, mineralogy, chemical composition, and economic availability of the great variety of our developed and undeveloped earth substances.

Because of our wartime experience, it is expected that the Geological Survey's intensive research and exploration will be continued at a high level in the future. The reports prepared on a war emergency basis will be reappraised with the idea of preparing final reports that will be as comprehensive as necessary to supply all required information for any purpose. The knowledge already available from the Geological Survey, however, concerning many individual mineral substances occurring in the United States is in such form that it can be used directly by industry as a guide to new and improved uses of naturally occurring substances of commercial importance. There is considerable new data on most of the mineral substances previously regarded as scarce in their occurrence in this country and the Survey has found that we possess a great variety of commercially suitable micas, fluorspar of all grades, metallic derivatives, refractory and processing clays and brines.

The wartime shift of population and industries into a number of the southern and western states will, to a considerable extent, prove to be permanent, and will require that the mineral resources of those areas be utilized by heavy industry and process industry alike, to the extent that they can contribute raw materials from sources near at hand. Here the data obtainable from the Geological Survey will undoubtedly be found to be of the greatest immediate importance, since it can be drawn upon to supply essential information of direct value in solving problems of raw material supply. New industries in new industrialized areas should be fully informed regarding the natural mineral substances available within economic reach of their operating plants. The Geological Survey can supply a great deal of this essential information, for wartime investigations have resulted in the discovery of many mineral deposits not previously known or at least not previously appreciated. Individual industries utilizing mineral substances in special categories should fully acquaint themselves with the information that has been obtained concerning their current or potential mineral needs.

The Geological Survey is national headquarters on water supplies. It can furnish detailed information concerning surface and underground water supplies in every part of the country and this is kept constantly up to date. Its water resources investigations are of the utmost economic importance from the industrial standpoint, since most industries have their own special requirements as to quality and mineral content of water used in their operations. The Water Resources Branch collects and publishes basic information on the conditions and uses of surface water and ground water in all parts of the country, operating from about 100 field headquarters.

More than 1000 Water Supply Papers have been published. One of the best known is No. 658, the *Industrial Utility of Public Water Supplies in the United States, 1932*, by W. D. Collins, W. L. Lamar, and E. W. Lohr. This covers the water supply systems of every city or town with over 20,000 population, 670 places in all. It presents 100 pages of analyses and includes a discussion of hardness, with a generalized map of the United States.

MAPS

Standard topographic maps prepared by the Geological Survey usually represent quadrangles about 15 miles square. Work has been in progress since 1882 and approximately half of the United States has been covered. Use of the aerial camera has greatly speeded progress in recent years, and a comprehensive mapping plan is being developed to vastly multiply map information during the next 15 years. Topographic mapping was carried on in over 30 states last year.

The topographic maps show:

(1) Relief-mountains and valleys, with contours representing altitude, form and grade;

(2) Drainage;

(3) Culture (works of man)—towns, cities, roads, boundaries.

All states now have some areas mapped but only ten are completely mapped. There are some maps of metropolitan areas. There are a dozen types of United States maps: contour, outline, relief, physical divisions, etc.

Geologic maps are usually issued in connection with reports on the geology of selected areas. For some of the areas shown on the topographic maps, geologic maps have been published in the form of folios. Each folio includes maps showing the topography, geology, underground structure and mineral deposits of the area mapped. Several pages of text explain the maps and describe the topographic and geologic features of the country and its mineral products.

A wall-map of the United States (4 sheets aggregating 51″ x 90″) shows over 160 rock units distinguished by patterns printed in 23 colors ($2.50).

ORDERING PUBLICATIONS

Available annual reports, monographs,

professional papers, bulletins, water-supply papers, and topographic maps are for sale by the Superintendent of Documents, Government Printing Office, Washington 25, D. C. Geologic folios and maps are sold by the Director, Geological Survey, Washington 25, D. C. Although many of the older reports issued by the Survey are out of print they are available for reference in technical and larger public libraries or in the Washington library of the Survey.

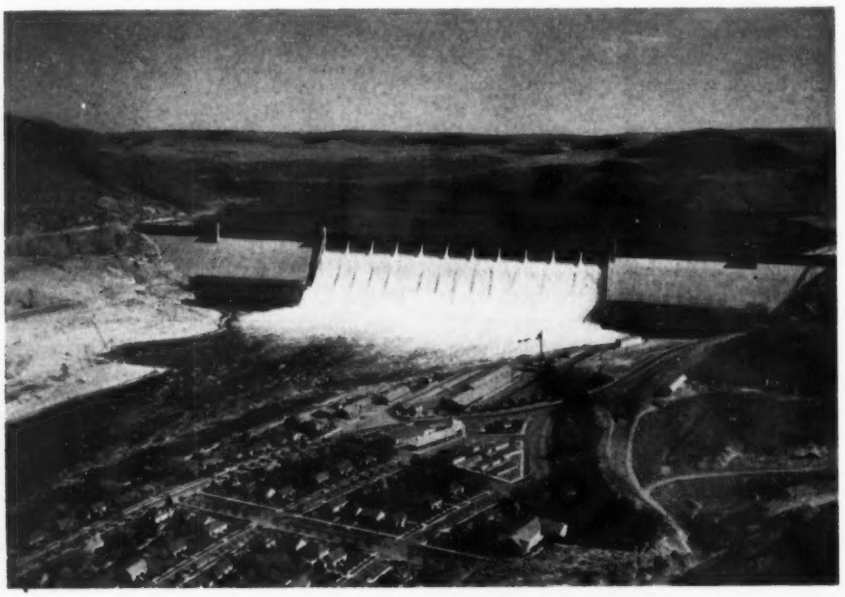
Publications of the Survey run into the thousands and selections can best be made by studying the catalog "List of Publications of the Geological Survey" (through October 1944) and monthly supplements, which are available free on request to the Director. "Price List 15" of the Superintendent of Documents shows the state of the stock of geology and water supply reports of the Geological Survey. The Superintendent of Documents' "Price List 53" covers maps of many kinds but not geologic maps.

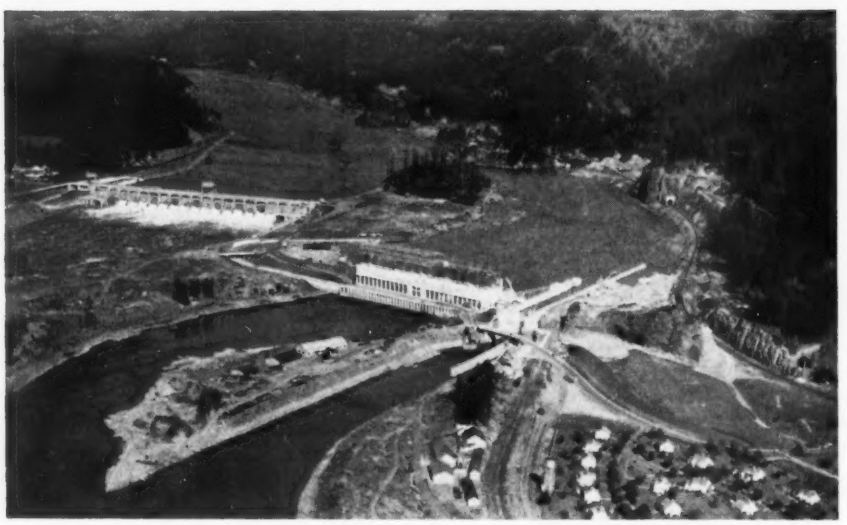
Publications of the survey comprise the following series:

1. Annual Reports
   Include collections of short papers of general nature or of local areas.
2. Monographs
   Detailed reports on geology, stratigraphy, mineral areas, paleontology and processes, covering restricted areas.
3. Professional Papers
   Detailed reports on research projects.
4. Bulletins
   Detailed reports on general geology, mineral resources, and special investigations.
   Typical examples are:

Bulletin 901. Clay Investigations in the Southern States, 1934-5 (1940) 346 pages $1.00
Bulletin 928-C. Adsorbent Clays; their distribution, properties, production, and uses, (1943) by P. G. Nutting $0.20
Bulletin 934. Phosphate Resources of Florida (1942) by G. R. Mansfield .. $1.00
Bulletin 935a. Chrome Resources of Cuba, (1942) by T. R. Thayer $1.00
Bulletin 935c. Tungsten deposits, Isle of Pines, Cuba (1944) by L. R. Page and J. F. McAllister $1.25

5. Water-Supply Papers
   Detailed reports on surface and underground water supplies in United States and possessions.
6. Circulars
   Shorter reports on progress or results of special investigations, such as C-3, Bleaching Clays.
7. Chapters and Volumes of the Mineral Resources of the United States (1882-1923).
   Statistical and descriptive.
8. Folios of the Geologic Atlas of the United States. Geologic maps and brief descriptions of geology and mineral resources of standard quadrangle areas.
9. World Atlas of Commercial Geology
   One publication in two parts. Special study of world's resources as of 1918-1919.
10. Land Classification Maps
    Appraisals of potential values of public lands for agricultural, reclamation, and mineral production potentialities.
11. Topographic Folios
    Special collections of maps of physiographic units.
12. Topographic Maps (with and without descriptive texts). Maps of quadrangles (approximately 225 square miles each) in United States Grid.





Bonneville Power Administration, which includes Grand Coulee Dam (above), is the nation's third largest power system. Modern market research methods supply the facts and figures calculated to persuade new industries to settle in the Pacific Northwest and increase the power load. Below is the Bonneville Dam on the Columbia River.

BONNEVILLE POWER

Bonneville Power Administration is one of the three largest power systems in the country, with an annual energy output of approximately 10 billion KWH, carried by a transmission system of over 2500 circuit miles. Average power billings have been less than 3 mills per KWH in recent years. By 1945, the power of the Bonneville and Grand Coulee Dams marketed by the Bonneville Power Administration had played a major role in the production of several billion dollars worth of ships, planes, light metals, calcium carbide, chemicals, explosives and other war supplies, including those connected with the atomic bomb project. Revenues from power sold for war purposes, 1942-45 aggregated over $40,000,000.

Created by Congress in 1937 to market power generated at the Bonneville Dam on the Columbia River, the Administration also sells power from the Grand Coulee Dam, and is directed by statute to encourage the widest possible use of electric energy. Dr. Paul J. Raver, Administrator, has utilized modern market research methods as the foundation of a far-reaching sales program.

The Division of Industrial and Resources Development, headed by Mr. Ivan Bloch, carries on continuing surveys of Pacific Northwest resources and potential power markets. It comprises three sections, devoted to sales, market analysis, and industrial analysis.

(1) The Section of Industrial Sales Contacts, directed by Mr. J. G. McCallum, undertakes a continued program of selected contacts throughout the Pacific Northwest, the West Coast, and the nation as a whole to determine current industrial interest in the Pacific Northwest and its power supplies. This program involves: (a) apprising industry of the potentialities of industrial establishment in the Pacific Northwest; (b) ascertaining of important questions relative to industrial establishment in the Pacific Northwest which the Division can attempt to answer.

(2) The Section of Market Analysis collaborates with other agencies of government and of industry to develop all available facts relating to markets, prices, freight rates, taxes, labor supplies and costs, community industrial plant sites, and the like. The activities of this section, headed by Mr. Samuel Moment, are

also twofold—to develop answers to the questions raised by industry and, if in the course of its current work the staff develops interesting market information, to pass such information on to the Industrial Sales Contacts Section for transmittal to interested industrial groups.

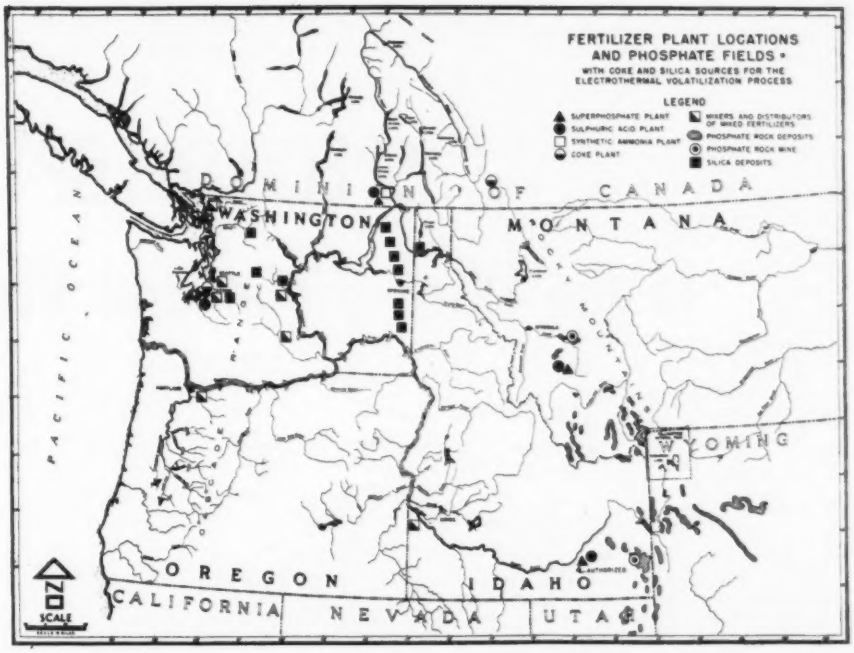
(3) The Industrial Analysis Section, under the direction of Mr. J. N. Carothers, is composed of technical men experienced in chemistry, metallurgy, forest products utilization, and mineral raw materials. It gathers, analyzes, and reports on the technological factors of industrial establishment in the Northwest and transmits its findings to the Industrial Sales Contacts Section for dissemination to industry.

The Division of Industrial and Resources Development cooperates closely with local civic organizations in the Northwest, and has the assistance of appropriate units of the Army Corps of Engineers, the U. S. Department of Agriculture, the Forest Service, and other agencies. The Division is desirous of maintaining constant contact with industrial organizations throughout the United States to build up a firm collaborative program.

The list of chemical industries which the Division is studying, with a view to drawing new establishments to the Northwest, includes aluminum, magnesium, iron, steel, ferrochromium, ferrosilicon, ferromanganese, ferrotungsten, ferromolybdenum, ferrotitanium, ferrovanadium, copper, lead, zinc, gold, silver, arsenic, sulfuric acid, manganese, chromium, ceramics, cement, glass, sodium silicate, silicon carbide, aluminous abrasives, hydrogen, oxygen, ammonia, liquid sulfur dioxide, acetylene, chlorine, caustic soda, hydrochloric acid, chlorates, perchlorates, carbon tetrachloride, carbide, tetrachloroethylene, trichloroethylene, acetic anhydride, glacial acetic acid, phosphates, silicon, carbon disulfide, phenolic resins, viscose rayon and cellophane, cellulose acetate, and ligno-plastics.

Studies which have been made by the Administration and published as documents available to the public are listed below, but these do not represent all of the material available to industry and located in the Division's files. For example, the Division has accumulated a file of coordinated mineral information which, it feels, is second to none in the Northwest. The files on economic information available in the Division are likewise extensive. They constitute an up-to-date and current collection of basic economic information, county by county, for the four Pacific Northwest states.

A valuable study issued in 1945 was "A Preliminary Report on the Plastics Industry as Related to Pacific Northwest Industry," for which the overwhelming demand had to be met with an immediate second printing. A new supplement in preparation deals with cellulose-base plastics, for which a great potential is believed to exist in the wood celluloid citadel of the Pacific Northwest.



The above map is a portion of one of the brochures published by the Bonneville Power Administration to point out the commercial and industrial opportunities in the Pacific Northwest.

An exhaustive report has been made on the zinc-lead mines of the Pacific Northwest and tributary areas.

The Columbia Basin Study, now under way, is perhaps indicative of the nature of future activities. For purposes of this study, a series of investigations are planned relative to above-listed industries and the possibility of attracting them to the Pacific Northwest as power consumers. Aspects of each industry to be studied include production technology, present producers, markets and market outlook, prices, raw materials, transportation and other pertinent factors.

PUBLICATIONS

Surveys are characterized by comprehensive scope and the splendid maps and charts with which a wealth of data are presented. Publications of interest to chemical market researchers include the following, which are available free of charge on request to the Bonneville Power Administration, Portland 8, Oregon.

Pacific Northwest Opportunities (May 1944)
Taxation of Industrial Corporations in Washington and Oregon (Sept. 1941)
Pacific Northwest Mineral Occurrence (July 1941)
Preliminary Report on the Plastics Industry as Related to Pacific Northwest Development (Nov. 1944)
Upper and Mid-Columbia Basin Industrial Surveys (October 1942)
Western Washington Industrial Surveys (September 1943)
Western Oregon Industrial Surveys (October 1943)
Columbia River Industrial Site Survey (September 1940; reissued April 1944)

A Series on "The Economic Base for Power Markets" separately covers each of about 20 counties.

A valuable survey "The External Trade of the Pacific Northwest" and a "Supplementary Analysis" were published in 1942 in cooperation with the National Resources Planning Board and the Northwest Regional Council. Based on rail and water freight movements these studies clearly showed the region's surplus of forest, agricultural and animal products and its deficiency in manufactured products.

In cooperation with the National Resources Planning Board and Northwest Regional Council: The External Trade of the Pacific Northwest (1942) Supplementary Analysis of the External Trade of the Pacific Northwest (1943).

FISH AND WILDLIFE

The Fish and Wildlife Service provides a great deal of specialized information that is of value to process industries which are interested in the fur crop, fish for fertilizer, meal, glue, oil, food, vitamins, and rodent poisons. Established in 1940, this Service consolidates work formerly carried on by the Bureau of Fisheries and the Bureau of Biological Survey and brings the biological sciences to the aid of agriculture, stock raising, fisheries, forestry, and game animals.

The Fish and Wildlife Service has headquarters in the Merchandise Mart, Chicago, and regional offices in Portland, Ore., Albuquerque, Minneapolis, Atlanta, Boston, and Juneau. The Director is Dr. Ira N. Gabrielson.

PUBLICATIONS

The Fish and Wildlife Service publishes several excellent periodical statistical reports dealing with fisheries and fish products. This work is done under the direction of A. W. Anderson, Chief, Division of Commercial Fisheries, Fish and Wildlife Service. All publications listed may be obtained free by writing the Service.

An annotated list of these publications follows:

Current Fishery Trade. — A brief monthly summary of information on landings and receipts of fishery products; production and holdings of frozen and cured fish; production of canned fish, fish oils, fish meals; and production and

(Turn to page 597)

SPECTROSCOPY

In the Ultra-Violet and Visible Bands

by RAYMOND G. RUSSELL* and NORMAN D. COGGESHALL**
Gulf Research & Development Company, Pittsburgh, Pa.

AFTER a somewhat slow beginning, the chemical industry is now utilizing more and more the technique and methods of spectroscopy for the solution of analytical and research problems. Here the applications of emission and absorption spectroscopy in the ultra-violet and visible region are discussed, consideration being given to methods of operation, accuracy and cost.

THE USE of a spectroscope for the separation of the various wavelengths of light has been known since the latter part of the 17th century, but it is only within the present century that it has been widely used as an analytical tool. In fact, it is only within the last decade that the improved source units and methods of recording and measuring spectra have caused it to be widely employed by industry.

EMISSION METHOD

There are complete books on the subject[1, 2, 3] so this discussion will be purposely short. Any atom which is excited emits light of definite wavelengths. Theoretically, electrons surrounding at atom are driven out of their normal orbits by some form of excitation and as these electrons return to their normal states, they emit light corresponding to the energy gained by the excitation. Since each atom has a different number of electrons and a different electron configuration, the light emitted on the return to the normal state is different. Thus each element in the universe has a different spectrum.

INSTRUMENT

A spectograph is an instrument which is able to take this assemblage of light of different wavelengths and spread them out in an orderly fashion, giving a visible representation on a photographic plate. Fig. 1 gives the essential optics of a prism spectrograph used in the Gulf laboratory. The sample is excited at the position marked arc and the light is focussed on the slit and turned by the small prism toward the refracting prism. At the camera and collimating lens the light is made parallel and goes through the prism where the various wavelengths of light are each bent a different amount. The light, which returns from the prism due to reflection from a mirror on the back surface, passes through the camera and collimating lens and is focussed on the photographic plate. As the wavelengths of light were bent differently in the prism, they will appear at different positions on the photographic plate, the exact position being dependent on the wavelength of the beam of light. Fig. 2, which is a photograph of a portion of the spectrum, shows the appearance of the unlike wavelengths after focussing on the photographic plate.

Although each of the 92 elements has a distinct spectrum, our discussion will be limited to those elements whose spectra are excited by arc or spark currents in air, and whose spectra appear between wavelengths 2000A ($1A = 10^{-8}$ cm.) and 8000A. The wavelength range is limited by the emulsions in the photographic plates used to record the spectra and the light absorption due to air. Such limitations exclude from consideration the rare gases, all of the halides except fluorine, carbon, oxygen, nitrogen, sulfur, selenium, and hydrogen. These elements either do not give spectra in the range 2000A-8000A or are not excited by the arc or spark in air. Therefore, the discussion is limited chiefly to the inorganic elements and excludes the study of those compounds which may be regarded as purely organic.

OPERATION

The dispersion of the spectrograph shown in Fig. 1 is such that approximately 30 inches of photographic plate are required to cover the complete range. This means that three separate samples must be weighed up in order to get the entire range on a ten inch plate. It takes approximately 2 minutes to completely burn an ordinary sample (i. e., an ash from an oil sample) in a 10 amp. arc so that it will take about 6 minutes to completely excite a sample over the wavelength range 2000A-8000A. Another 20 minutes are required for developing, washing, and drying the photographic plate, and 10 minutes for an experienced operator to interpret the spectra. Thus a complete qualitative analysis for about 75 elements is obtained within 45 minutes. In addition, other samples can be exposed on the same plate and an experienced operator can give an approximate concentration grouping to the elements found so that the time per sample is reduced even further and more nearly quantitative results are obtained. The various lines of the elements always occur at exactly the same place on a photographic plate with a reproduced setting of the spectrograph optics. The blackness of the element line is nearly proportional to its concentration in the sample. It is thus possible to compare line blacknesses with chemical analyses and to build up experience in grouping elements found present in a sample.

The time required for quantitative analyses is even shorter than that for qualitative analyses once a particular method is set up. Considerable time will be required to prepare a set of standards for quantitative analyses, to get exposure conditions correct and to pick the proper element lines for use, but once this is done, future quantitative analyses on samples of similar composition, as the standards, will be quite rapid. For in-

* Spectroscopist.
** Physicist.

The authors are indebted to Dr. Paul D. Foote, Executive Vice-President of the Gulf Research & Development Co. for permission to publish this material.

stance, it should be possible to make 50 separate determinations on steel rods in an hour.

Any type of sample can be handled for either qualitative or quantitative analysis. There are numerous factors to be considered before attempting to analyze a sample and some of these will be taken up under quantitative procedures. The following are some of the normal types of samples encountered: crude oils, used oils, oil additives, sucker rods or any metallic sample, corrosion products, geological samples, water samples, catalyst materials, flue dusts, plants, paints, and process solutions.

Samples sent to the spectroscopic laboratory must be representative of the material being analyzed. A dry sample is ground in a mortar and pestle, liquid or wet samples are evaporated to dryness and thoroughly mixed, oils or greases are heated until they ignite and are permitted to burn. The ash is then ignited at 500° C to burn off volatile and carbonaceous material remaining. Samples containing volatile inorganic compounds are converted to a non-volatile condition or are exposed directly.

Finally the samples are accurately weighed into deep cups drilled in the end of purified graphite rods. The electrode containing the sample is burned by means of a 10 amp., D. C. arc, the light being focussed on the slit of the spectrograph by means of a quartz lens.

The photographic plate is developed for 2 minutes in an agitated constant temperature (70° C) bath using D-19 developer. It is then hardened in a solution of dilute acetic acid and fixed with an acid fixer.

The dry developed plates are placed in a projector and an image of the plate is focussed on the wall. Fig. 2 is a photographic reproduction of a portion of an actual sample plate to give an idea of the appearance of spectra. Plates are read by reference to an iron spectrum placed on each plate and the elements are classified by the reader. Samples subsequently analyzed quantitatively in the chemical laboratories give checks and help the reader in correctly interpreting the plates. Table I is a typical qualitative analysis.

TABLE I. Qualitative Analysis of an Oil Additive

Concentration	*Element*
Major Constituents	Ba, P
1—10%	Zn
0.1—1%	Si, Fe, Al
0.01—0.1%	Ca, Cu, Na Pb, Sr
<0.01%	Mg, Sn, Ti Ag, Cr

RESULTS

Many conditions should be satisfied before actually undertaking an analysis. Two of these are reproducibility and accuracy. Results may be quite reproducible without being near the true value. On a comparative basis within a given set of samples reproducibility is most important. Table II gives the reproducibility of a few samples with a check against the chemical results (where known) which are assumed here to be the true values. In most instances the reproducibility is quite good. The accuracy seems equally good once standards are procured in which the elemental contents are known. Spectroscopic methods are in general decidedly superior in accuracy to regular routine chemical results in amounts less than 0.10%. They are of equal accuracy in amounts from 0.1 to 1.0% and somewhat less accurate in amounts above 1%. These groupings of accuracy are, however, quite general and should not be taken too seriously until an attempt has actually been made to analyze a sample. There is a trend towards increasing the accuracy in the higher percentage groups and so make analyses for elements present in higher percentages amenable to spectrographic methods.[4,5]

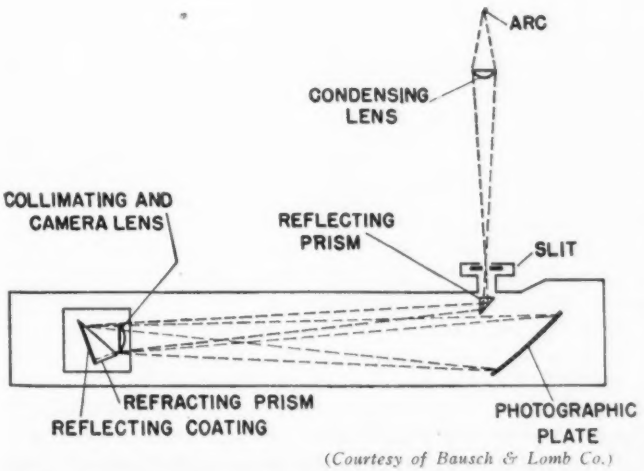
There are many methods of making quantitative analyses spectrographically. DC arc excitation can be used, though it usually is not as reproducible as the AC spark. An example, the determination of Na in catalyst materials will make such methods clearer. A sample of catalyst is dried at 500° C and one gram of it thoroughly mixed with exactly 2.2 gms. of purified natural graphite (to act as a conductor, diluent, and briquetting medium), and 0.10 gm. of CuO (to act as an internal standard). The mixture is briquetted and the half inch briquets are excited by means of a 35,000 volt AC spark along with briquets of a set of standards of similar composition but in which the sodium content varies. The photographic plate on which the spectrum lines are recorded is developed, fixed and dried, and a sodium line and a copper line in each sample are measured for their transmission values. These values are referred to an emulsion calibration curve and final intensity ratios of sodium line to copper line are plotted against percentage composition of the standards. The sodium values are as accurate as chemical analyses and are obtained in one-quarter the time.

TABLE II. Reproducibility of Na in Catalyst Materials

Chemical Analyses		*Spectroscopic Analyses*				
Sample No.		*Run No. 1*	*2*	*3*	*4*	*5*
106K	0.11	0.19	0.12	0.11	0.10	0.10
RN-23-25	0.33	0.32	0.35	0.32	0.34	0.35
RN-18-96A		0.14	0.16	0.13	0.16	0.15
RN-18-96B	0.18	0.19	0.16	0.16	0.20	0.17
RN-18-96C		0.20	0.23	0.21	0.22	0.23

ABSORPTION METHOD

In absorption spectroscopy use is made of the differences in light absorption by unlike compounds. One compound may absorb light very strongly in certain wavelength regions, while a second compound will have its regions of absorption which, in general, will not be the same. This, of course, is part of the phenomena



(Courtesy of Bausch & Lomb Co.)

Fig. 1. Schematic diagram of a spectograph used for emission work.

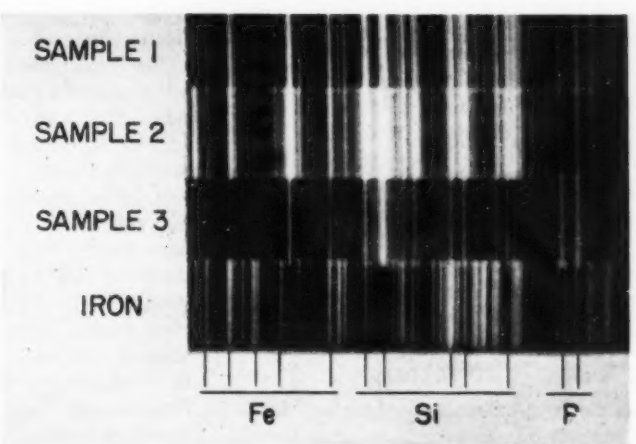


Fig. 2. Enlarged portion of spectra showing lines due to Fe, Si, and P.

of different compounds having different colors.

A molecule or an ion will, in general, absorb light of a particular wavelength if the energy carried by the individual photons is of a value nearly the same as that needed to excite the ion or molecule from its quantum ground state to a permissible quantum state. The factors which decide what wavelength regions in which a particular compound will absorb are inherent in the disposition of the electrons shared by the atoms and in the formation of the valence bonds. A complete understanding of these factors in terms of a manageable theory is not available at present and many of the applications have been worked out empirically.

In the investigation of the light absorbing properties of a material the general procedure is to isolate light of a desired wavelength and to measure what percentage of the radiation the specimen will transmit. For this purpose an instrument such as shown in Fig. 1 may be used. However, in recent years the application of this branch of spectroscopy has increased to the point where it is of great value to have instruments designed especially for the purpose. Cary and Beckman[6] have described such an instrument, which is now available commercially. One of these instruments with slight modifications is shown in Fig. 3. Here a photoelectric cell is used to measure the light intensity and it is located behind an exit slit, this assembly replacing the photographic plate as an energy registering device. A mechanical system allows the refracting prism to be rotated so that light of the desired wavelength passes through the exit slit. The sample is located between the exit slit and photoelectric cell and means are provided to move the sample in and out of the beam to measure the percentage transmission directly.

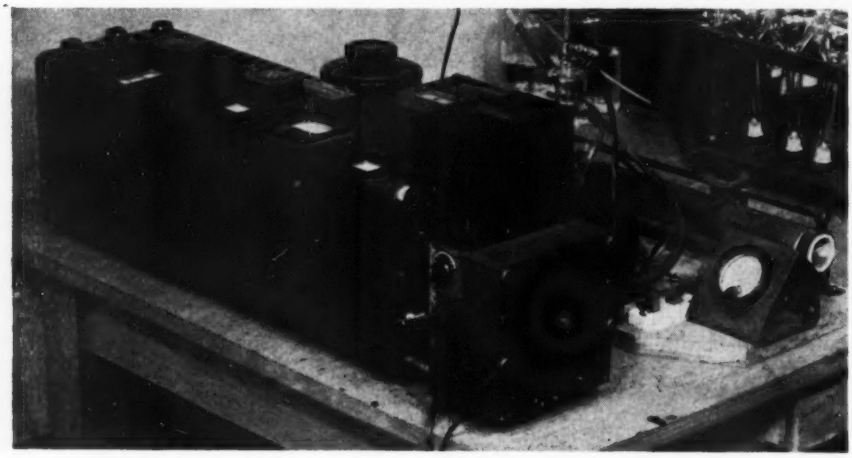


Fig. 3. National Technical Laboratories quartz spectrophotometer used for absorption spectroscopic studies.

OPERATION

Such instruments are used both for the analysis of hydrocarbons and for the analysis of inorganic ions. In the case of the inorganic ions, the ion, such as chromium, is converted by a chemical reaction into a highly colored complex such as $CrO_4^=$ and its transmission read at definite wavelengths. Fig. 4 comprises two curves, one of K_2CrO_4 in alkaline solution, the other of $Cu(NH_3)_4^{++}$ in alkaline solution. Generally speaking ions are determined colorimetrically by being converted to highly colored ions in a solution of definite pH, their transmission at some previously determined wavelength being measured. This transmission value is then compared with the transmission values of a series of standards containing the ion in varying known concentrations. Numerous technical details must be investigated before such procedures are used. Interfering ions must be removed before making the readings, otherwise the readings obtained will not be truly representative of the ion being determined. It is necessary to know whether Beer's law is obeyed. If this law is obeyed a plot of extinction against concentration results in a straight line.

RESULTS

Using the general techniques given above it is possible to determine all of the inorganic elements. In fact, books have been published giving details for most of the elements.[7] Such colorimetric methods are valuable for odd samples for which the spectroscopic methods would not be justified.

The ultra-violet region of the spectrum, which may be roughly defined to lie between 2100A and 4500A, is a very fertile one for furnishing analytical methods in the investigation of certain classes of chemically unsaturated compounds. In this region neither paraffins, mono-olefins nor alcohols have any absorption. Aromatics are one class of compounds which do absorb in this region. The benzene ring nucleus is responsible for the absorption and gives rise to a minimum of transmission, the exact amount of transmission being dependent upon the specific derivative. Fig. 5 shows the absorption spectrum in this region of benzene, toluene and m-xylene. The data were obtained for the compounds in solution using iso-octane as solvent and the dilutions used are shown in the figure. As the absorption cell that was used was only 1 cm. in thickness it is clear that these compounds are very strong absorbers in this region.

Referring to Fig. 5 it is seen that, whereas the curve for benzene has a number of unique features, those for toluene and m-xylene are quite similar. There are, however, enough differences in both intensity and position as regards wavelengths that such data form the basis for analytical work. The exact manner of utilizing the singularities in the absorption spectra of the individual compounds to analyze a mixture for the separate concentrations will not be described here. It is the same in principle as used for the infra-red analyses of multicomponent gas mixtures.[8, 9]

In the petroleum industry one very useful application of the high ultra-violet absorption by benzene derivatives is the analysis of gasoline fractions for aromatic content. Since the paraffins, mono-olefins, and naphthenes do not absorb light in this region, the absorption found will be due to the aromatics present. If the instrument is properly calibrated the absorption data may be used in calculations which will yield the benzene, toluene, ethyl-benzene, o-xylene, m-xylene, and p-xylene concentrations directly. The accuracy of the method can be judged from Table III,

TABLE III. Aromatic Analyses

Results for analyses of synthetic blends under routine conditions. S% =% in synthetic as blended, F% = % found in sample by ultra-violet absorption. Δ% = % difference in terms of total sample.

Blend No.	*Compound*	*S%*	*F%*	*Δ%*
	benzene	1.0	0.9	−0.1
1	toluene	19.0	19.3	+0.3
	total aromatics	20.0	20.2	+0.2
	benzene	6.4	6.0	−0.4
2	toluene	4.0	4.2	+0.2
	total aromatics	10.4	10.2	−0.2
	benzene	0.5	0.6	+0.1
3	toluene	2.0	2.1	+0.1
	ethyl-benzene	0.5	0.3	−0.2
	total aromatics	3.0	3.0	0.0
	benzene	0.5	0.5	0.0
4	toluene	1.5	1.4	−0.1
	ethyl-benzene	0.2	0.0	−0.2
	total aromatics	2.2	1.9	−0.3
	toluene	1.0	1.1	+0.1
5	ethyl-benzene	8.0	8.1	+0.1
	p-xylene	1.0	1.0	0.0
	total aromatics	10.0	10.2	+0.2
	ethyl benzene	1.0	1.0	0.0
	o-xylene	1.0	1.0	0.0
6	m-xylene	2.0	2.0	0.0
	p-xylene	6.0	6.1	+0.1
	total aromatics	10.0	10.1	+0.1
	o-xylene	6.0	5.6	−0.4
7	m-xylene	3.0	3.0	0.0
	p-xylene	1.0	1.0	0.0
	total aromatics	10.0	9.6	−0.4
	o-xylene	4.0	3.6	−0.4
8	m-xylene	3.0	3.1	+0.1
	p-xylene	3.0	3.0	0.0
	total aromatics	10.0	9.7	−0.3

which shows the results between blended composition and observed concentrations on a series of samples examined in a routine manner.

As may be seen from Table III this method yields the concentrations of the individual aromatics with an average error of about 0.2% of total sample. This method has the advantages over the spe-

cific dispersion method of aromatic analyses in that it gives the concentrations of the individual aromatics, it is not necessary to determine bromine numbers or specific gravities and it allows analyses to be made on smaller samples. In general, there is an increase in accuracy, this being dependent upon the amount of care used in each technique. The complete routine analysis of a gasoline cut including preparation of sample, taking the data, making the calculations and reporting the results requires about 50 minutes.

The conjugated diolefin, butadiene, is a hydrocarbon that in the past few years assumed tremendous importance. Doubtlessly the use of this compound will continue in industry operating under peacetime conditions. For the detection and quantitative analysis of butadiene in the presence of mono-olefins and paraffins, ultra-violet absorption spectroscopy affords a very valuable and simple method. Due to the conjugation of its double bonds, this compound absorbs light very strongly in the ultra-violet region of 2300A. Since the mono-olefins and paraffins of similar molecular weight do not absorb in this region, an analysis for butadiene can be obtained directly, giving the concentration with errors of less than 0.1% of total sample. Such analyses can be done with an overall time expenditure of twenty minutes or less, including calculations. Beckman[10] tells of the use of the method for automatic recording. He also tells of the utilization of the method for the automatic control of reflux ratio in plant installations producing butadiene. In this case equipment similar to that seen in Fig. 3 is shown with the addition of suitable electronic and mechanical devices for the utilization of the signals from the spectrophotometer.

Many examples could be listed of groups of chemically unsaturated compounds which are industrially important and for which the analytical problems are easily solved by means of ultra-violet absorption. General rules defining the combinations which can be analyzed by this method are not easily set up. This is because one compound may absorb light with much greater intensity than others occurring in the same process. Styrene, for example, has absorbing powers much greater than ethyl-benzene or the xylenes, although this absorption takes place at different wavelengths. When one compound absorbs so much more strongly than others, the analysis for the weaker ones is made difficult. This difference in absorption can in some cases be turned to good advantage as it makes possible direct analysis of a mixture for the strongly absorbing compound when data are taken at only one wavelength.

The ultra-violet absorption technique is a useful tool in many research problems. Usually when a compound has absorption in this region it may be ascribed to a certain part of the molecule. If the same molecular group occurs in a different compound, it, too, will have similar absorption properties. A simple example of this effect may be seen in Fig. 5. Here each of the aromatics shown has an absorption band lying between 240 and 280 mμ (1 mμ = 10^{-7}cm, = 10A) which is due to absorbing powers of the benzene ring nucleus. Brode has tabulated some of the common groups responsible for absorption.[11] For example, the carbonyl group, C=O, has characteristic absorption around 280 mμ, the mercapto group, S-H, around 230 mμ, etc. Since these groups absorb in the same general wavelength region irrespective of the remainder of the molecule, it makes it possible to identify them in compounds whose structures are not completely known. When used in this manner the ultra-violet constitutes a tool of importance in the determination of molecular structure.

Many types of investigations and analyses, both exact and empirical, are possible by use of this technique. It is not exactly a new one in chemical industry, but recent needs associated with the war effort have accelerated the growth and perfections of new applications. Many fields are hardly touched as regards the proper interpretation of the results and many more applications are to be expected.

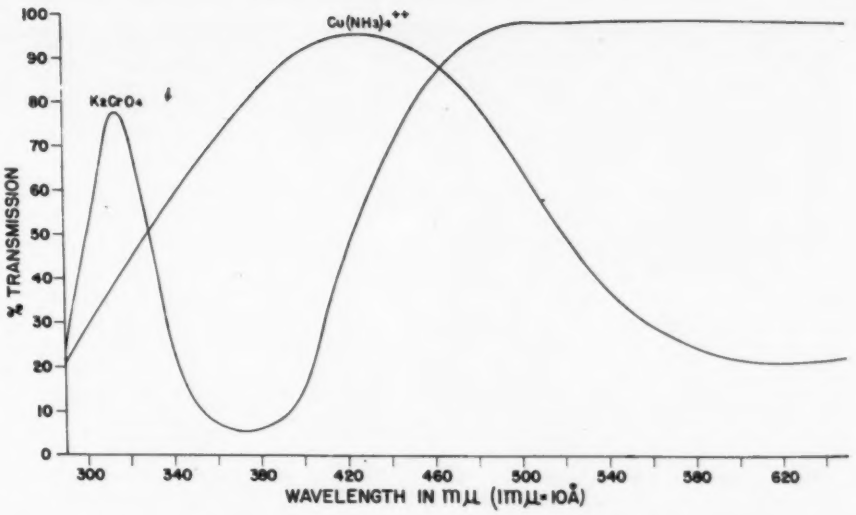


Fig. 4. Absorption spectra for two different species of inorganic ions.

COST

If it is desired to set up an emission spectroscopic laboratory, a sum between $7,000 and $10,000 should be set aside for the buying of equipment. This includes the spectrograph, source units, briquetting press, densitometer, projector, developing equipment, etc. For the equipment necessary to do absorption work in the ultra-violet and visible, a minimum of about $1,800 is needed for equipment. In either activity the hiring of competent technical personnel is very important if the apparatus is to be used on new problems.

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11. W. R. Brode, Op. Cit., Chap. VIII.

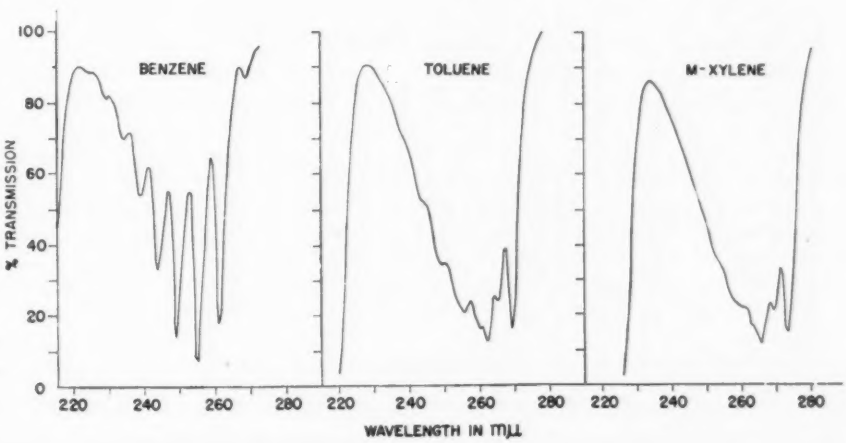


Fig. 5. Absorption spectra in ultra-violet region for three aromatics.

Agriculture is big business, and like any other business, it stands to benefit from the results of research on its particular problems.

NEW AGRICULTURAL CHEMICALS Combat Pests and Improve Crops

by E. D. WITMAN, Sherwin-Williams Research
Ohio State University Research Foundation
Columbus, Ohio

FOLLOWING IN THE WAKE OF DDT, a host of new chemicals have proved their usefulness in combatting insects and fungus growths, preventing premature drop of fruit crops, killing weeds, defoliation, and other applications where crops are saved or improved, or production expedited. In the face of a world-wide food shortage, these advances take on enhanced significance.

THE RECENT war, fought largely as it was in insect-infested, tropical areas like the South Pacific and North Africa, raised insecticides to a position of vital importance. Many of these insecticides, developed chiefly to combat lice and mosquitoes, are now finding use in agriculture. Awakened interest in agricultural chemicals in general has spurred development of other materials, too, which find special and important applications.

The subject matter in this discussion is divided into three general categories, (1) insecticides, (2) fungicides and (3) specialties. It is the intention of the author to cover only the recent findings and to describe their history, preparation, formulation and general properties.

INSECTICIDES

DDT.—The contraction DDT represents the product of the reaction of chloral and chlorobenzene in the presence of sulfuric acid. This product contains as major constituents two different chemicals, both called dichlorodiphenyltrichloroethane. The major constituent is the *p,p'*-isomer. Its chemical name is 1,1,1-trichloro-2,2-bis(*p*-chlorophenyl)ethane. It occurs in the product to the extent of about 70%. The other, the *o,p'*-isomer, makes up most of the 30% balance. The *p,p'*-isomer is much more insecticidal than the *o,p'*-isomer.

The product was first prepared in Germany about 80 years ago by Zeidler. He subsequently isolated the pure *p,p'*-isomer and determined it as a pure chemical compound. Only recently, Mueller, of the Geigy Company, discovered and patented its insecticidal properties (U. S. patent 2,057,965).

DDT is manufactured today much the same as it was prepared 80 years ago by Zeidler—from chloral and chlorobenzene in the presence of sulfuric acid.

As mentioned before, the product of this reaction contains two isomers and is known as DDT. The product is generally used without further processing.

The formulation of DDT into insecticides presents quite a problem. DDT as it comes from the chemical process is nearly useless as an insecticide because of its physical properties—gumminess, large irregular particles, etc.

DDT is really our first outstanding synthetic organic insecticide with the necessary requirements of a high order of toxicity to insects, a low order of toxicity to plants and animals, long-lasting effectiveness and good compatibilities in general. Its position as a valuable addition to

the insecticide field is assured and, as research develops, its uses will become even more widespread.

DDD.—A compound much like DDT from a chemical standpoint has just recently been made available. Its chemical name is 1,1-dichloro-2,2-bis-(*p*-chlorophenyl)ethane.

It is sold under the name Rhothane and may be made from dichloroacetaldehyde, chlorobenzene and sulfuric acid, in a manner similar to DDT.

Hexachlorocyclohexane. — This chemical has been recently introduced by the English. It is also called 666, Gammexane and benzene hexachloride. It must not be confused with hexachlorobenzene which is valueless as an insecticide.

When benzene is treated with chlorine under the influence of sunlight or certain catalysts, each molecule of benzene adds six atoms of chlorine to produce a mixture of hexachlorocyclohexanes. So far, four hexachlorocyclohexanes have been isolated from the reaction product—the α, β, γ, and δ isomers. Of these four, the gamma (γ) isomer is by far the most insecticidal but it occurs only to the extent of about 10% to 13% in the reaction product. Some samples are available in which some of the less insecticidal isomers have been removed and the gamma isomer content is as high as 35%. Reports so far indicate that 666 may find use as a general aphicide and in the control of cotton insects. Generally speaking, it may be regarded as a complement rather than a substitute for DDT.

Aerosol dispenser for DDT. Originally used in tents, it is now practical in the field.

Miscellaneous.—Greenhouse men have been studying azobenzene as a control for red spiders. Provided optimum conditions are maintained it is very effective. Its use under field conditions is limited by its volatility and likelihood of injury to some plants. It is prepared in a number of ways, one of which is the reduction of nitrobenzene.

Phenothiazine was studied as an insecticide several years ago, but various disadvantages have retarded its widespread use. It is, however, used in some areas in the control of codling moth. Large quantities are used in internal parasite treatment of animals. Phenothiazine is easily made by heating diphenylamine with sulfur, using a bit of iodine as a catalyst.

Xanthone, sold under the name of Genicide has been recently suggested for use in the control of red spider in the field. It may be prepared from phenyl salicylate by heating.

For use as an insecticide, xanthone must be formulated much like the DDT powders.

A compound which may find use as an aphicide, competing with nicotine, and perhaps as an insecticide for various insects attacking cotton, is a chlorinated hydrocarbon marketed under the name 1068.

Aerosols.—There has always been a need for new developments in methods of applying parasiticides and the perfection of the aerosol method is a step in this direction. In effect, the toxicant is dispersed in a very fine state of subdivision by such methods as allowing a liquefied gas solution to be sprayed into space, by quickly volatilizing small quantities of a toxicant by means of hot-plates, hot exhaust pipes, etc. Studies have been made under field conditions with excellent results. These methods certainly increase "speed" of kill of parasites and thoroughness of coverage, but in some cases the long-lasting effects are lost.

FUNGICIDES

Dithiocarbamates.—This group of compounds, along with the closely related thiurams, was developed and patented a number of years ago as fungicides, but their general use has been quite recent. Dithiocarbamic acid is the parent of the group.

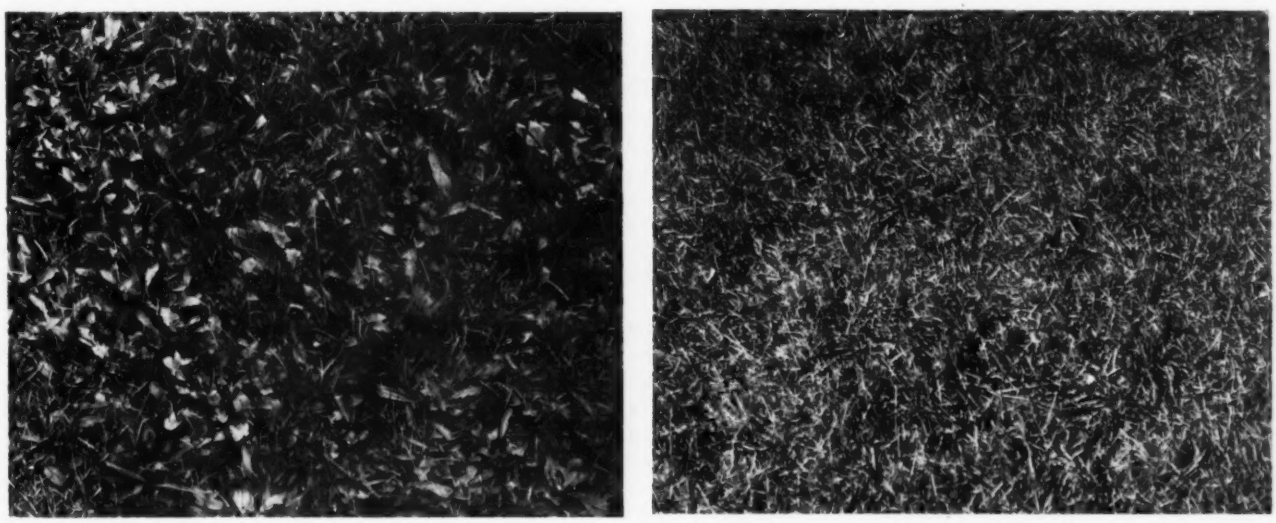
Dithiocarbamic acid itself is unstable but is easily prepared as its ammonium salt by simply stirring carbon disulfide and ammonium hydroxide together. This substance is not used as a fungicide.

If, instead of ammonia one uses an organic derivative of ammonia such as dimethylamine, a similar reaction occurs, producing sodium dimethyldithiocarbamate. The soluble sodium salt is then changed to the iron or zinc salt by adding a soluble salt of the metal.

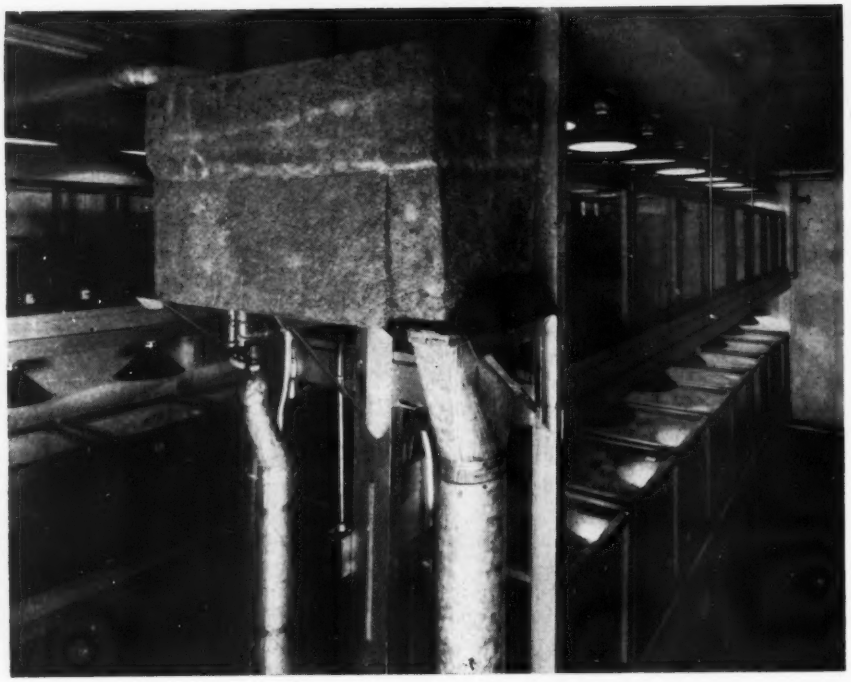
These insoluble iron and zinc salts are used in the control of various plant diseases. The copper salt is not regarded as a useful fungicide. The calcium salt (formed when dithiocarbamates are applied in the presence of lime) is soluble and is likely to be removed from the plant surface by rain. It is, however, quite fungicidal.

Disodium ethylene-bis-dithiocarbamate may be prepared by reacting ethylenediamine with carbon disulfide in the presence of aqueous caustic soda.

The commercial product offered is an aqueous solution of this soluble sodium salt, and most recommendations call for



Left and right, respectively, are before and after photographs of a lawn treated with a 0.1 per cent emulsion of ethyl dichlorophenoxyacetate (ethyl ester of 2,4-D) applied at the rate of one gallon per 200 square feet and then fertilized to encourage growth of bluegrass.



Chambers for study on the Japanese beetle and the Mexican bean beetle. Light, temperature, and humidity are regulated to give optimum conditions for growth and feeding of the pests.

its use with zinc sulfate and lime—which in effect brings on a precipitation of zinc ethylene-bis-dithiocarbamate in the spray tank.

Tetramethylthuiram disulfide, as well as other thuirams, is produced by controlled oxidation of a solution of dimethyldithiocarbamic acid. These compounds find use as turf and seed fungicides.

Miscellaneous.—The quinones are being used and studied as fungicides for both seeds and crops.

Tetrachlorobenzoquinone may be prepared from phenol by first oxidizing and then chlorinating. This product is used as a seed fungicide. It has the capacity to sublime—volatilizing from the solid state directly to the gaseous state without liquifying. Another quinone which has recently been studied as a crop fungicide is 2,3-dichloronaphthoquinone.

Interest has been shown for the past several years in various quaternary ammonium compounds. They may be regarded chemically as derivatives of ammonium hydroxide and its salts.

Isoquinoline lauryl bromide has been studied as a fungicide for apple scab. These compounds are termed cation-active since in solution they ionize forming an anion (negative ion) of bromine and a cation (positive ion) containing the complex organic radical.

Heptadecyl glyoxalidine, also known as compound #341, has also been studied as a crop fungicide, showing good control of apple, cherry and rose diseases.

It is insoluble in and not wetted by water and thus must be formulated into a useful spray material.

An organic mercury compound has been used with excellent results in an experimental way on apples. It is known chemically as phenylmercuritriethanolammonium lactate. Its preparation hinges upon the fact that various organic mercury compounds form complexes with substances such as triethanolamine.

SPECIALTIES

Synthetic Growth Regulators.—Not so many years ago a practical use was found for some of the synthetic growth regulators. That use was the retardation of Fall drop of apples and pears by spraying with a dilute solution of α-naphthaleneacetic acid or its derivatives. The preparation of these chemicals requires a number of complex chemical processes.

At about the same time various growth regulators were developed as root promoting substances. These included the above acid, its amide, and sodium salt as well as indole-3-acetic acid and (indole-3)-N-butyric acid.

More recently many experimental uses have been developed for the synthetic growth regulators. Among these are rooting, fruit setting, blossom thinning, fruit ripening, delayed budding, early flowering, prolonging dormancy, delaying abscession, in grafting, production of wide angles between trunk and branch of fruit trees, inducing seedless fruit, selective weed killing, etc.

The list of synthetic organic chemicals which produce these effects to various degrees is imposingly long today. Perhaps of greatest interest are the phenoxyaryl acids, typical of which are 2,4-dichlorophenoxyacetic acid and β-naphthoxyacetic acid.

β-Naphthoxyacetic acid is made as its sodium salt by heating β-naphthol and chloroacetic acid together in a solution of caustic soda, while 2,4-dichlorophenoxyacetic acid is formed (as its sodium salt) under similar condition where 2,4-dichlorophenol is used instead of β-naphthol.

The abbreviation, 2,4-D, has been applied to describe the compound 2,4-dichlorophenoxyacetic acid.

One of the outstanding wartime developments has been that of 2,4-D as a selective herbicide. Generally speaking, it is toxic to broad leaf plants (dicotyledons) and harmless to grasses (monocotyledons) when sprayed on the foliage at the rate of 200 gallons of a 0.1% solution per acre.

It, like DDT, requires some degree of formulation in order to secure maximum field performance. Three types of 2,4-D formulations are offered so far—(1) those containing the acid, (2) those containing the salts and (3) those containing esters.

The acid is available as water miscible solutions. The sodium salt is available as a 70% to 80% dry powder which is soluble in water. The triethanolamine salt is available as an aqueous solution containing up to 40% equivalent of 2,4-D. The methyl and butyl esters are available in water-miscible solutions up to 40% concentration.

Acting as a "systemic" poison, 2,4-D kills not only the tops but the roots of many plants and thus gives hope for controlling many of our noxious, perennial, deep-rooted plants.

Miscellaneous.—The development of greater color in apples and pears has been brought about by spraying with solutions of sodium thiocyanate or α-naphthyl isothiocyanate.

In addition to work with the synthetic plant growth regulators as blossom thinning agents, 3,5-dinitro-*o*-cresol has been studied with various degrees of success.

This substance is a weak acid and readily dissolves in caustic soda solution forming a sodium salt. Both the phenol and its salts are bright yellow and dye wool and silk permanently. They are both used in dormant insecticide application, for wood killing and have been recommended as "orchard floor eradicant fungicides." A close relative, dinitro-*o*-cyclohexylphenol (and its dicyclohexylamine salt) are used in fruit spraying.

Two new rodenticides are a development of increased wartime research. They are sodium fluoroacetate, known as 1080; and α-naphthylthiourea, known as A.N.T.U.

The extremely high toxicity of 1080 is accounted for by the theory that it is a physiological poison. Its use by the public may be limited because of the demand for skill in handling. A.N.T.U. is described as a "contact" poison for rodents.

Insect repellents, for use on man, were known long before the war, but pressing needs of the armed forces increased pressure on research in this field. Available today are dimethyl phthalate, 2-ethylhexanediol-1,3, and tetrahydro-β-naphthol (tetralol), to mention only a few.

GERMANY'S Prewar Foreign Trade in CHEMICALS

EDITORIAL STAFF REPORT

THE DEFEAT OF GERMANY elicits questions about her former trade in chemical products. Such information lends weight to speculations concerning the size of the export market left for other suppliers, including the United States. Presented here is an overall summary of Germany's prewar foreign trade based on official German Reich publications. Optimism for greatly expanded markets for U. S. suppliers is tempered by the fact of Germany's relatively small trade compared with American production, and the realization that Germany's best customers do not have foreign exchange to make American purchases.

SINCE the collapse of Germany a great deal of attention has been paid to the export markets in the chemical field formerly enjoyed by the German Reich.

In order to arrive at a valid conclusion as to the extent of the relative importance of a given country's foreign trade in any particular field, exports of an individual sub-group must be compared with total exports. For this reason we list, in Table 1, Germany's total imports and exports together with imports and exports of non-agricultural products. In a similar way, the balance of trade (excess of exports over imports) is given for the total foreign trade as well as the foreign trade in non-agricultural products. Against these major groups, foreign trade in chemical products is listed together with the balance of trade resulting from chemical products alone. The next step is to express exports of chemical products as a comparison of total exports as well as exports of non-agricultural products. The respective trade balances are treated in a similar way.

Brief inspection of Table 1 discloses that exports of chemical products during the period from 1932 to 1937 averaged about 15% of total non-agricultural exports and about 14.5% of total exports. The favorable balance of trade resulting from the export of chemical products, however, averaged about 30% of the balance of trade resulting from exports of non-agricultural products reaching a peak of 43.3% in 1934. Comparisons with the total balance of trade are of no practical value as Germany balanced her foreign trade by importing agricultural products.

Table 1 thus clearly demonstrates that from Germany's point of view, chemical exports were of greatest importance to obtain foreign exchange. It is for this reason that the world is now looking to potential markets in chemical products formerly enjoyed by Germany. As will be later demonstrated, the importance of Germany's exports in chemical products is greatly over-rated from the point of view of the Anglo-Saxon countries.

In Tables 2, 3, 4 and 5, Germany's foreign trade in chemical products is given for the years 1929, 1932 to and including 1937. Table 2 lists exports in millions of R. M.s, Table 3 imports in millions of R. M.s, and Tables 4 and 5 list exports and imports in thousands of metric tons. Exports and imports are sub-divided into 14 major sub-groups and the tonnage figures may be of aid in comparing the volume of exports and imports especially with regard to 1929. There is, of course, no significance in the total tonnage figure; the significance lies only within the sub-groups. The conversion into metric tons is based upon the weights determined by the "Brussels Conference."* Exports and imports from 1934 to 1937 were relatively stable with the exception of a sharp rise in 1937, corresponding with generally good business conditions prevailing throughout the world.

Table 7 presents Germany's imports and exports as well as exports of chemical products by countries for the years 1935, 1936 and 1937. An analysis of this table

* International Agreement Clarifying Commodities Entering International Trade.

TABLE 1. SUMMARY OF GERMANY'S TOTAL FOREIGN TRADE
(in millions of R.M.)

	1929	1932	1933	1934	1935	1936	1937
Imports							
Non-Agricultural Products	8,066	3,144	2,574	2,908	2,724	2,719	3,373
Total	13,447	4,668	4,204	4,451	4,159	4,218	5,468
Exports							
Non-Agricultural Products	12,613	5,520	4,649	4,017	4,174	4,681	5,821
Total	13,483	5,736	4,871	4,167	4,270	4,768	5,911
Balance of Trade (Excess of exports over imports)							
Non-Agricultural Products	+4,547	+2,376	+2,075	+1,109	+1,450	+1,962	+2,448
Total	+ 036	+1,068	+ 667	− 284	+ 111	+ 550	+ 443
Foreign Trade in Chemical Products							
Imports	326.6	169.7	147.7	174.1	147.1	130.3	131.3
Exports	1,410.5	721.5	688.8	653.8	655.0	682.6	818.5
Excess of Exports over Imports	+1,083.9	+551.8	+541.1	+479.7	+507.9	+552.3	+687.2
Exports of Chemicals as per cent of							
A. Non-Agricultural Exports	11.2%	13.1%	14.8%	16.3%	15.7%	14.6%	14.1%
B. Total Exports	10.5	12.6	14.1	15.7	15.3	14.3	13.8
Chemical Balance of Trade as per cent of							
A. Non-Agricultural Balance of Trade	23.8%	23.2%	26.1%	43.3%	35.0%	28.1%	28.1%
B. Total Balance of Trade	3,010.8	51.7	81.1		457.6	100.4	155.1

TABLE 2. GERMANY'S EXPORTS OF CHEMICAL PRODUCTS

(in millions of R.M.)

	1929	1932	1933	1934	1935	1936	1937
1. Chemicals incl. intermediates	349.2	207.6	201.9	186.0	187.9	191.7	242.8
2. Photographic chemicals	59.9	36.4	33.1	35.5	32.5	31.0	34 5
3. Pharmaceuticals	131.1	102.4	105.7	104.4	108.6	111.0	139.8
4. Cosmetics	15.1	6.8	6.7	5.5	5.3	5.4	6.5
5. Aromatics & essential oils	20.9	11.0	9.3	7.5	8.5	9.5	9.5
6. Dyestuffs (tar derivatives)	204.1	133.8	134.0	143.6	132.0	135.9	148.3
7. Mineral pigments	62.5	34.7	33.9	30.8	31.1	31.1	31.6
8. Oil paint, lacquer & varnish	69.5	35.6	34.1	31.0	30.3	30.2	31.2
9. Glue & gelatine	20.2	9.5	8.8	8.0	7.6	7.7	9.5
10. Nitrogen fertilizer	302.9	77.4	60.4	49.0	59.0	56.2	68.9
11. Phosphate fertilizer*	16.2	2.6	1.5	1.6	2.0	2.3	2.2
12. Explosives	26.4	12.8	13.5	12.2	12.9	23.2	36.0
13. Artificial silk & intermediates	98.3	36.1	32.8	25.3	23.2	32.3	28.8
14. Plastics	34.1	14.8	13.1	13.4	14.2	15.1	28.9
Total	1410.5	721.5	688.8	653.8	655.0	682.6	818.5

* Excluding Basic or Thomas slag.

TABLE 3. GERMANY'S IMPORTS OF CHEMICAL PRODUCTS

(in millions of R.M.)

	1929	1932	1933	1934	1935	1936	1937
1. Chemicals incl. intermediates	126.8	54.0	58.6	59.9	52.1	47.1	45.9
2. Photographic chemicals	6.4	4.2	2.7	2.6	1.9	1.3	1.0
3. Pharmaceuticals	9.5	10.3	6.8	6.9	7.2	7.2	6.0
4. Cosmetics	4.9	1.5	1.0	0.9	0.7	1.0	.5
5. Aromatics & essential oils	19.5	7.9	6.9	8.1	7.4	7.3	7.3
6. Dyestuffs (tar derivatives)	22.0	14.4	10.9	12.9	12.3	12.9	10.0
7. Mineral pigments	12.0	5.5	5.6	5.6	5.3	3.9	3.8
8. Oil paint, lacquer & varnish	4.3	1.5	1.3	1.1	0.8	0.8	.6
9. Glue & gelatine	4.8	1.6	1.0	1.0	0.7	0.9	1.9
10. Nitrogen fertilizer	30.4	10.9	1.2	14.9	10.9	11.0	19.7
11. Phosphate fertilizer*	8.9	6.6	3.0	4.0	3.3	3.3	4.2
12. Explosives	1.7	0.2	0.2	0.3	0.2	0.8	.2
13. Artificial silk & intermediates	70.5	48.4	45.6	53.0	42.2	31.2	27.8
14. Plastics	4.9	2.7	2.9	2.9	2.1	1.6	2.4
Total	326.6	169.7	147.7	174.1	147.1	130.3	131.3

* Excluding Basic or Thomas slag.

TABLE 4. GERMANY'S EXPORTS OF CHEMICAL PRODUCTS

(in 1000's of metric tons)

	1929	1932	1933	1934	1935	1936	1937
1. Chemicals incl. intermediates	1001.9	712.6	675.3	656.4	735.5	800.4	1006.7
2. Photographic chemicals	6.6	4.2	4.0	5.0	5.4	5.4	6.2
3. Pharmaceuticals	9.7	6.3	6.6	6.5	6.6	7.2	8.6
4. Cosmetics	3.7	1.6	1.8	1.5	1.8	1.8	2.1
5. Aromatics & essential oils	2.1	1.3	1.2	1.1	1.3	1.4	1.4
6. Dyestuffs (tar derivatives)	43.2	29.3	27.1	33.7	34.1	34.1	38.5
8. Oil paint, lacquer & varnish	23.2	14.9	15.2	14.5	15.1	15.5	14.5
7. Mineral pigments	104.0	78.3	72.4	79.2	83.8	85.7	86.9
9. Glue & gelatine	10.7	6.4	6.4	5.4	4.9	4.9	5.3
10. Nitrogen fertilizer	1448.7	649.5	612.3	549.7	718.5	632.6	807.8
11. Phosphate fertilizer*	208.1	53.6	31.8	38.2	54.0	54.1	48.2
12. Explosives	10.2	4.9	5.2	5.4	6.6	10.8	17.0
13. Artificial silk & intermediates	11.1	9.1	9.6	7.4	6.4	10.2	8.4
14. Plastics	9.7	4.6	5.0	5.3	5.6	6.6	18.8
Total	2892.9	1576.6	1473.9	1409.3	1679.6	1670.6	2070.4

* Excluding Basic or Thomas slag.

TABLE 5. GERMANY'S IMPORTS OF CHEMICAL PRODUCTS

(in 1000's of metric tons)

	1929	1932	1933	1934	1935	1936	1937
1. Chemicals incl. intermediates	300.1	289.0	373.9	321.3	271.1	253.3	268.6
2. Photographic chemicals	0.7	0.4	0.3	0.3	0.4	0.3	.2
3. Pharmaceuticals	0.9	1.8	1.3	1.2	1.1	1.5	1.4
4. Cosmetics	0.5	0.2	0.1	0.1	....	0.1	....
5. Aromatics & essential oils	1.5	1.0	1.2	1.5	1.4	1.4	1.4
6. Dyestuff (tarderivatives)	4.6	3.4	3.1	3.5	2.9	2.7	2.3
7. Mineral pigments	21.4	14.8	19.4	19.4	14.9	11.6	12.0
8. Oil paint, lacquer & varnish	1.9	0.6	0.7	0.7	0.5	0.7	0.7
9. Glue & gelatine	3.2	1.4	0.9	0.9	0.6	1.0	2.1
10. Nitrogen fertilizer	155.8	76.5	8.9	122.3	91.2	94.7	210.3
11. Phosphate fertilizer*	129.2	142.0	56.3	91.6	70.3	68.1	71.6
12. Explosives	0.6	0.1	0.2	0.3	0.1	0.2	.1
13. Artificial silk & intermediates	10.9	12.7	13.3	18.1	16.1	11.6	13.8
14. Plastics	1.9	1.3	1.7	1.6	1.3	1.0	1.9
Total	633.2	545.2	481.3	582.8	471.9	448.2	586.4

* Excluding Basic or Thomas slag.

TABLE 6. 1937 SALES OF I. G. FARBEN*

(in millions of R. M.)

Product	Domestic Sales	Export Sales	Total
Dyes	114.9	212.5	327.4
Auxiliaries	27.9	30.6	58.5
Chemicals	342.0	75.9	417.9
Pharmaceuticals and Insecticides	36.2	83.7	119.9
Perfumes	1.3	1.7	3.0
Photographic	59.1	40.2	99.3
Rayon	136.2	2.7	138.9
Nitrogenous materials	181.9	50.0	231.9
Gasoline	118.8	0.0	118.8
Total	1018.3	497.3	1515.6

* From "Economic Study of I. G. Farben," Lt. Col. A. E. Linke.

discloses that the largest markets for German products were Western Europe, Latin America, Scandinavia and East Asia. For chemical products, however, the order was as follows: East Asia, Western Europe, Latin America, and Scandinavia.

In presenting the data we chose the year 1929 as the peak of international trade prior to the depression of the 'Thirties. The subsequent years, 1932 to 1937, were chosen to show the development of German foreign trade under the Third Reich. Nineteen hundred and thirty-seven happens to be the last comparable year; statistics for 1938 already included Austria and, to some extent, parts of Czechoslovakia.

No attempt was made to convert R-Marks into dollars for the simple reason that the German exchange was artificially kept on the gold standard; actually, the mark was already devalued in 1930 by trade restrictions. Should anybody desire to convert the German export or import figures into dollars, it is safe to convert them at the rate of 5 marks to the dollar. This rate of exchange is based upon an average of the free exchange rate of the mark in the markets of Amsterdam, London and New York.* Such a conversion will demonstrate the relatively small value of German chemical exports in the international market.

The import and export data are based on Monatliche Nachweise ueber den auswaerigen Handel Deutschlands; published by Statistisches Reichsamt, Berlin.

This agency reports monthly German foreign trade subdivided into 202 subgroups including 14 chemical sub-groups. The constituents of the sub-groups, however, were changed in 1937 so that in order to obtain a continuous series, the 1937 sub-groups had to be broken down into their individual constituents and reclassified.

These 14 chemical sub-groups comprise between 2,000 and 2,100 individual products. While it is impossible to trace the individual chemical sub-groups by countries over a period of years, it is possible to follow-thru individual chemical products such as ammonia, individual dyestuffs, etc., by countries. This information may be obtained from a supplementary copy, Ergaenzungsheft I: Der Deutsche Aussenhandel nach Erdteilen u. Laendern; published by Statistisches Reichsamt, Berlin.

REFERENCES**

1. Monatliche Nachweise ueber den Auswaertigen Handel Deutschlands; published by Statistischen Reichsamt, Verlag fuer Sozialpolitik, Wirtschaft & Statistik, Paul Schmidt, Berlin.

1a. Ergaenzungsheft I: Der Deutsche Aussenhandel mach Erdteilen & Laendern; same publisher.

* Wochenberichte des Instituts fuer Konjunkturforschung. Berlin 1938. (Statistisches Riechsamt.)

** Available at the Columbia University Library, New York, N. Y.

Note on commodity breakdown:

I. *Ernaehrungswirtschaft* (Foodstuffs) *Warenklassen* (Groups)	
A. Lebende Tiere (Livestock)	4
B. Nahrungsmittel Tierischen Ursprungs (Animal foodstuffs)	11
C. Nahrungsmittel Planzlichen Ursprungs (Vegetable foodstuffs)	30
II. *Gewerbliche Wirtschaft* (Non-agricultural	
A. Rohstoffe (Raw materials)	35
B. Halbwaren (Semi-finished goods)	36
C. Fertigwaren (Finished goods)	86
	202

NOTE: Since the major portion of this article was prepared, a microfilm report available from the Office of Publications Board has revealed statistics on the foreign trade of I. G. Farbenindustrie, compiled in Table 6. The year 1937 was chosen for comparison, and it can be readily seen that the correlation is generally good. There are, however, a few discrepancies; and it is interesting to note that I. G. is shown to have exported more than Germany itself. Such discrepancies are generally of small order and can be traced to variations in the manner in which the data were compiled, and also, possibly, to different bases for declaration of value. It would appear that I. G. carried a book value on its exports higher than the declared value obtained from the government sources. On the basis of these figures alone, it is not possible to determine what proportion of the exports was made by the I. G. firm. —EDITOR.

TABLE 7. GERMANY'S FOREIGN TRADE BY COUNTRIES WITH SPECIAL REFERENCE TO EXPORTS OF CHEMICAL PRODUCTS
(in millions of R. M.)

	1935			1936			1937		
	Imports	Exports	Chemical Exports	Imports	Exports	Chemical Exports	Imports	Exports	Chemical Exports
Europe									
Austria	71	108	18	77	109	20	93	123	21.5
Belgium-Luxemb.	126	202	21	139	212	20	198	288	25.5
Bulgaria	41	40	5	58	48	7	72	68	8.6
Czechoslovakia	121	130	22	112	139	29	141	151	32.6
Denmark	119	142	20	154	182	23	158	213	22.4
Estonia	13	11	2	14	18	3	24	20	3.2
Finland	41	49	8	46	54	8	70	78	12.1
France	154	253	18	99	255	17	156	313	20.5
Greece	59	49	6	68	64	7	76	113	12.9
Hungary	78	63	16	93	83	19	114	111	27.7
Italy	188	278	31	209	241	26	221	311	31.1
Latvia	31	28	5	33	31	6	46	28	5.0
Netherlands	196	404	32	169	396	33	216	468	41.4
Norway	94	87	10	88	91	11	91	140	13.4
Poland	59	48	7	58	53	9	68	73	12.2
Portugal	23	29	6	22	30	7	24	38	5.9
Roumania	80	64	15	92	104	20	180	130	27.1
Russia (U.S.S.R.)	215	39	6	93	126	7	65	117	7.2
United Kingdom	256	375	42	264	406	47	309	432	58.2
Spain	118	106	32	98	69	19	101	55	8.4
Sweden	153	207	29	192	230	29	232	277	37.3
Switzerland	114	257	31	106	226	31	94	231	35.2
Yugoslavia	61	37	8	75	77	12	132	134	18.6
Others	60	52	1	44	49	1	...	...	...
Total	2471	3058	391	2403	3293	411	2941	3982	488.0
North America									
Canada	13	23	6	19	35	6	49	33	6.2
U. S. A.	241	170	34	232	172	38	282	209	44.1
Total	254	193	40	251	207	44	331	242	50.3
Latin America									
Argentina	143	97	16	119	98	13	295	147	23.3
Brazil	177	119	25	131	133	21	186	177	29.8
Chile	52	32	6	59	49	8	81	56	10.8
Columbia	21	28	5	42	45	6	45	33	10.2
Cuba	5	10	3	8	11	2	9	13	2.1
Mexico	38	34	10	56	51	13	65	66	16.9
Peru	36	18	3	34	29	5	49	33	5.4
Uruguay	21	12	2	21	17	2	24	24	3.3
Venezuela	9	14	2	14	24	3	24	43	4.6
Total	502	364	72	484	457	73	778	592	106.4
Africa									
Egypt	44	38	11	37	43	9	48	49	5.2
Union of S. A.	68	42	4	59	58	5	102	73	6.9
Others	150	44	...	195	56	...	150	122	...
Total	262	124	15	291	157	14	300	244	12.1
Asia									
British India	121	111	30	142	122	27	169	148	42.6
British Malaya	27	9	2	52	18	2	97	19	2.6
China	102	96	28	114	133	35	94	148	34.6
Dutch East Indies	120	35	11	113	39	11	122	56	14.1
Japan	21	83	28	24	75	24	26	117	36.4
Turkey	93	67	5	119	79	5	98	111	11.3
Others	39	63	4	52	82	6	...	...	...
Total	523	464	108	616	548	113	606	599	141.6
Oceania									
Australia	35	26	4	43	35	4	78	40	6.2
Others	6	4	1	12	6	1	17	9	...
Total	41	30	5	55	41	5	95	49	6.2
Iceland & Arctic	12	5	*20	14	6	*17	20	6	...
Grand Total	4159	4270	655	4218	4768	683	5071	5714	804.6

* Includes Arctic Regions.

Services and Publications of The U. S. BUREAU OF MINES

by RICHARD M. LAWRENCE

Development Department, Atlas Powder Company
Wilmington, Delaware

Space limitations last month prevented our publishing the check-list of publications available from the Bureau of Mines. The fourth installment of this series, on the Bureau of Mines, is concluded in these pages, and No. 5, dealing with other Department of the Interior agencies, is to be found on p. 582 in this issue.—EDITOR.

CHECK-LIST OF PUBLICATIONS

Except for "Sales Publications," all are free on request to the Office of Mineral Reports, U. S. Bureau of Mines, Washington 25, D. C.

Catalogs and Indexes

List of Publications of the Bureau of Mines 1910-1937.
List of Publications of the Bureau of Mines 1937-1942.
Annual supplements, 1943 and 1944.
New Publications of the Bureau of Mines (monthly).
Price List 58—Mines, Explosives, Fuel, Gas, Gasoline, Petroleum, Minerals (Lists stocks of the Superintendent of Documents).

Sales Publications

Order from Supt. of Documents, Washington 25, D. C.

Minerals Yearbook, Annual, latest issue 1943, $2.50; 1942, $2.25; 1935 to 1941, $2.25 each; 1932 to 1934, out of print.
Preprints ("separates") of chapters available for 1944 and for earlier years (5c to 20c each).
Mineral Resources, the predecessor series, continuously covered the period 1882 to 1923 (Geological Survey) and 1924-1931 (Bureau of Mines).

Technical Papers

TP 606 Production of Explosives in the U. S., 1938, 10c.
TP 627 Production of Explosives in the U. S., 1939, 10c.
TP 636 Production of Explosives in the U. S., 1940, 10c.
TP 647 Production of Explosives in the U. S., 1941, 10c.
TP 658 Production of Explosives in the U. S., 1942, 10c.

Economic Papers

Petroleum Coke (1930), out of print.
Economics of Crushed-Stone Production (1931), 15c.
Trends and Seasonal Variations in Factors Influencing Motor Fuel Demand.
Potash (1933), 10c.
Arsenic (1934), 5c.
Iron and Steel Industries of Europe (1939), 20c.

Handbooks and Miners' Circulars

These manuals cover first aid, safety methods, etc.
Schedules
Testing procedures for equipment and materials, e. g. "Procedure for Applying for Tests Made on All Explosives and Blasting Devices by the Explosives Division of the Bureau of Mines."

Annual Reports of the Director

1911 to 1944.

Reports of Investigations

RI 3257 Production of Explosives in the U. S. (1934), 10c.
RI 3285 Production of Explosives in the U. S. (1935), 10c.
RI 3317 Production of Explosives in the U. S. (1936), 10c.
RI 3350 Production of Explosives in the U. S. (1937), 10c.
RI 3414 Production of Explosives in the U. S. (1938), 10c.
RI 3533 Active List of Permissible Explosives and Blasting Devices, 1940.
RI 3551 Beehive and Byproduct Coking in Washington, 1941.
RI 3554 Survey of Fuel Consumption at Refineries, 1939.

Information Circulars

I. C. No.	
6221	Barite and Barium Products (1930)
6256	Phosphate Rock (1930)
6312	Radium (1930)
6313	Marble (1930)
6317	Selenium and Tellurium (1930)
6321	Monazite, Thorium and Cerium (1930)
6328	Tantalum (and Columbium) (1930)
6329	Sulphur (1930)
6331	Cobalt (1930)
6365	Titanium (1930)
6381	Feldspar (1930)
6385	Nitrogen and its compounds (1931)
6387	Bromine and Iodine (1930)
6391	Diatomite (1931)
6401	Gallium, Germanium, Indium and Scandium (1930)
6406	Magnesium Compounds (1931)
6437	Magnesite (1931)
6453	Thallium (1931)
6456	Zirconium (1931)
6457	Hafnium (1931)
6466	Bismuth (1931)
6488	Iceland Spar and Optical Fluorite (1931)
6471	Rubies and Sapphires (1931)
6474	Quartz and Silica (1931)
6475	Rhenium (and Masurium) (1931)
6482	Chalk, Whiting and Whiting Substitutes (1931)
6499	Boron and its compounds (1931)
6504	Umber, Sienna and other Brown Earth Pigments (1931)
6560	Pumice and Pumicite (1932)
6562	Abrasive and Industrial Diamonds (1932)
6563	Soapstone (1932)
6564	Consumption of Primary Tin in the United States during 1930 (1932)
6566	Chromium (1931)
6571	Fuels Consumed by the Federal Government during the Fiscal Year ended June 30, 1930 (1932)
6572	Vanadium (1932)
6579	Sodium and Potassium Metals (1932)
6635	Natural Gasoline Plants in the United States Jan. 1, 1932 (1932)
6639	Economic Factors Influencing the Domestic Demand for Gasoline (1932)
6647	Silver Consumption in the Arts and Industries of the United States in a 4-year period (1932)
6687	Growth and Development of Nonmetallic Mineral Industries (1933)
6720	Vermiculite (1933)
6728	Petroleum Refineries, Including Cracking Plants, Jan. 1, 1933 (1933)
6729	Manganese (1933)
6751	Onyx Marble and Travertine (1933)
6756	Limestone (1933)
6773	Silver Yield From Copper Ores and the effects of 64.64-cent Silver on the value of Copper Ores Produced in the United States (1934)
6780	Meerschaum (1934)
6781	Calcium Chloride (1934)
6782	Greensand (1934)
6789	Amber (1934)
6817	Asbestos (1934)
6821	Tungsten (1935)
6822	Mica (1935)
6833	Sodium Sulphate (1935)
6844	Jade (1935)
6847	Rare Earths (1935)
6882	Alums and Aluminum Sulphate (1936)
6884	Lime (1936)
6897	Natural Gasoline Plants in the United States, Jan. 1, 1936 (1936)
6906	Petroleum Refineries, including Cracking Plants in the U. S., Jan. 1, 1936 (1936)
6930	Consumption of Primary and Secondary Tin in the United States in 1935 (1936)
6751R	Onyx Marble and Travertine (1940)
6884R	Lime (1941)
7034	Petroleum Refineries, including Cracking Plants in the U. S., Jan. 1, 1938 (1938)
6988	Trends in Sales of Memorial Stone (1938)
6997	Marketing Mica (1938)
6998	Marketing Clay (1938)
7031	Natural Gasoline Plants in the U. S., Jan. 1, 1938 (1938)
7049	Gypsum and Anhydrite (1939)
7054	Lithium (1939)
7080	Marketing Talc, Pyrophyllite, and Ground Soapstone (1939)
7062	Marketing of Salt (1939)
7091	Petroleum Refineries, Including Cracking Plants, in the United States, Jan. 1, 1939 (1939)
7102	The Cement Industry of Latin America (1940)
7106	Nonmetallic Mineral Industries in 1939 (1940)
7117	The Potash Situation (1940)
7124	Petroleum Refineries, Including Cracking Plants, in the U. S., Jan. 1, 1940 (1940)
7126	Natural Gasoline Plants in the U. S., Jan. 1, 1940 (1940)
7139	Grinding Pebbles and Tube-Mill Liners (1940)
7149	Marketing of Barite (1941)
7161	Petroleum Refineries, Including Cracking Plants, in the U. S., Jan. 1, 1941 (1941)
7169	Limestone and Dolomite in the Chemical and Processing Industries (1941)
7174	Lime-Fuel Ratios of Commercial Lime Plants in 1939 (1941)
7177	Marketing Graphite (1941)
7184	Marketing Feldspar (1941)
7196	Crude-Oil and Gasoline Pipe Lines in the U. S., May 1, 1941 (1941)
7197	Chalk and Whiting (1942)
7200	Strontium Minerals (1942)
7202	Marketing Silica (1942)
7203	Development of the Sand and Gravel Industry (1942)
7212	Sodium Carbonate (1942)
7217	Marketing Mineral Pigments (1942)
7219	Marketing Strategic Mica (1942)
7220	Home Insulation with Mineral Products—Conservation of Fuel for War (1942)
7225	Marketing Lithium Minerals (1942)
7226	High-Grade Dolomite Deposits in the U. S. (1942)
7233	Monazite Sand (1943)
7234	Marketing Kyanite and Allied Minerals (1943)
7239	Olivine (1943)
7247	Economic Considerations in the Recovery of Magnesia from Dolomite (1943)
7258	Strategic Mica (1943)
7263	Industrial Insulation with Mineral Products (1943)
7265	Trends in Consumption and Prices of Building Materials (1943)
7266	Graphite (1944)
7269	Marketing Magnesite and Allied Products (1944)
7270	Marketing Vermiculite (1944)

7277 Langbeinite (1944)
7295 Corundum (1944)
7315 A Pattern for Western Steel Production
7320 Trends in Consumption and Prices of Chemical Raw Materials and Fertilizers (1945)

Weekly Reports

Weekly Anthracite-Beehive Coke Reports. Give current data on production, consumption and stocks of Pennsylvania anthracite and of beehive coke. Consumption and stock figures are on a monthly basis, by consumer groups. Comparisons are made with previous periods.

Weekly Coal Reports. Give current data on production, distribution, consumption, stocks and loadings of bituminous coal and lignite. Production data is by States and producing districts; consumption and stock figures are by consumer groups and are monthly; stocks are also shown by regions. Comparisons are made with previous periods.

Weekly Crude Oil Stock Reports. Show stocks of crude oil at the end of the week by grades and principal States. Comparisons are made with previous periods. Included is a brief discussion of supply and demand of crude oil for the current week.

Monthly Reports

Aluminum Alloy Monthly Reports. Gives monthly data on consumption and stocks of purchased aluminum scrap at secondary smelters; stocks, production and shipments of aluminum alloys at secondary smelters.

California Petroleum Statements. Monthly reviews of supply, demand and stocks of petroleum in the Pacific Coast area. (Obtainable only from the Petroleum Economics Division, Bureau of Mines, 1545 U. S. Post Office and Courthouse Building, Los Angeles, California.)

Coal Mine Fatalities. Describes causes of fatal accidents and relationship between production and accidents.

Copper Scrap Consumers Reports. Give monthly figures on consumer stocks of purchased copper-base scrap, consumption of purchased copper scrap, and production of secondary copper and copper-alloy products.

Crude Refinery Reports. Show State data on refinery stocks of crude oil, runs to stills, and receipts and deliveries of crude oil segregated on the basis of intrastate, interstate, and foreign sources, and by methods of transportation.

Ferrosilicon Reports. Give monthly data on consumption, stocks, shipments, imports, and exports of silvery pig iron, ferrosilicon, silicon metal, and miscellaneous silicon alloys.

International Coal Trade. Reports the latest information on the international coal trade of the world, and includes information on production and consumption and other matters which may be available on all countries in the world.

International Petroleum Trade. Reports on foreign imports and exports of petroleum products, international refining and trade in petroleum products, and special items from foreign representatives of the State Department and other sources.

Iron Ore Monthly Reports. Contain monthly data on production and shipments of steel furnace and other ore and stocks by States.

Lead Scrap Consumers Reports. Give monthly data on stocks, receipts, and apparent consumption of lead-base and tin-base scrap, by previous use of the metals; estimated lead, tin, and antimony content; disposition of white metals recovered from scrap. Comparisons with past periods.

Mine Production of Copper Monthly Reports. Give monthly production of copper by regions or States.

Mine Production of Gold Monthly Reports. Give monthly production of gold by regions or States.

Mine Production of Lead Monthly Reports. Give monthly mine production of lead by regions or States.

Mine Production of Silver Monthly Reports. Give monthly production of silver by regions or States.

Mine Production of Zinc Monthly Reports. Give monthly production figures for zinc, by regions or States.

Mineral Trade Notes. Include many miscellaneous statistics on metals and industrial minerals (nonmetallics). Contain many general items of information which cannot readily be classified by individual commodities. Issued on a confidential basis during the war, but since V-J Day has been restored to publication.

Monthly Bauxite Production Reports. Give monthly data on production of bauxite at mines, stocks at mines, processing and consuming plants, distribution to consumers and processors from the mines, and domestic bauxite shipped or sold by mines and processing plants to consuming industries, by uses.

Monthly Cement Reports. Give monthly data on production, shipments, and stocks of Portland cement in the United States, Puerto Rico, and Hawaii, by producing districts. Capacity data is also included for each producing district. Also includes clinker data.

Monthly Cement Report Supplements. Give monthly data on the distribution of cement by States. Also gives data on fuel consumption of the industry.

Monthly Coal Distribution. Compares trends of major movements. Gives information on the district of origin, State or area of destination, and method of movement of bituminous coal and lignite shipments. Also gives information on size distribution.

Monthly Coke Reports. Production of beehive and byproduct coke by States, stocks of coke and coking coals, consumption of coal in the manufacture of coke, and production of benzol and ammonia.

Monthly Forecast Reports. Give estimates on domestic and export demand for petroleum and set forth crude oil requirements by States.

Monthly Fluorspar Reports. Give monthly data on production, shipments, imports, consumption, and stocks of finished fluorspar; production, shipments, and mine stocks of domestic fluorspar by grades; consumption and consumers' stocks of domestic and foreign fluorspar by industries; imports by countries.

Monthly Manganese Reports. Contain monthly figures on consumption and consumers' stocks of manganese ore and manganese alloys by industries; shipments from domestic mines, imports, consumption and stocks of manganese ore; maganese ore imports, battery and other, by countries.

Monthly Mercury Reports. Production, consumption, imports, exports, stocks, and prices of mercury are given monthly. Imports are by countries.

Monthly Molybdenum Reports. Contain monthly data on production, shipments, and producers' and consumers' stocks of molybdenum.

Monthly Petroleum Statements. Give data on production, imports, exports, stocks, and demand for crude petroleum and refined petroleum products, by States or districts.

Monthly Platinum Metals Reports. Give monthly data on new and secondary platinum metals recovered by refiners, imports by countries, exports, platinum metals sold to consuming industries in the United States, and stocks held by refiners, dealers, and importers, and by the Office of Metal Reserve in the United States.

Monthly Tungsten Reports. Contain monthly data on production, shipments, imports by countries, and stocks of tungsten ore and concentrates; production and shipment of tungsten products; consumption and industry stocks of tungsten ore and concentrates, ferrotungsten, and tungsten powder.

Monthly Vanadium Reports. Give monthly figures on mill receipts, imports, and consumption of vanadium.

Monthly Zinc Reports. Monthly data on production, consumption, stocks, and imports and exports of zinc oxide, zinc dust, and slab zinc. Includes data on both primary and secondary zinc.

Natural Gasoline Reports. Show production, stocks, receipts, and deliveries of natural gasoline and allied products.

Nonferrous Scrap Dealer's Reports. Give monthly data on receipts, shipments, and stocks of nonferrous scrap, including copper, lead-tin, aluminum, zinc and nickel.

Preliminary Estimates of Production of Pennsylvania Anthracite and Coke. Statements issued for use of financial editors and business statisticians who want monthly figures.

Preliminary Estimates of Production of Bituminous Coal and Lignite. Statements issued for use of financial editors and business statisticians who want monthly figures.

Zinc Scrap Consumers Reports. Monthly data on receipts, consumption, and stocks of purchased zinc scrap and residues by previous use of zinc; stocks, production, and shipments of zinc-base products made entirely or partly from purchased zinc scrap and residues.

Quarterly Reports

Foreign Minerals Surveys. Regional reviews of foreign mineral resources, production, and trade.

Quarterly Bauxite Reports. Give quarterly data on mine production and stocks of bauxite, mine shipments to consumers and processors, bauxite shipped or sold by mines and processors to consumers, by use: stocks, receipts, consumption, and shipments of bauxite which include data from Office of Metal Reserve stock-pile operations: imports and exports of bauxite, by countries.

Quarterly Cobalt Reports. Give quarterly figures on imports, exports, consumption, and stocks of cobalt materials; production and shipment of specified cobalt products and stocks at refiners and processors; cobalt consumed (exclusive of salts and driers) by uses, and stocks of cobalt held by industrial consumers.

Quarterly Gypsum Reports. Present data of production of crude and calcined gypsum, imported crude gypsum, and sales of calcined gypsum and gypsum products.

World Retail Prices and Taxes on Gasoline, Kerosine, and Motor Lubricating Oils. Comprises tables showing retail prices and taxes on gasoline, kerosine, and motor lubricating oils in representative cities in various countries of the world.

Annual Reports

Annual Petroleum Statements. Review salient statistics on the petroleum industry relating to both crude petroleum and refined products. Production, stocks, consumption, distribution, and value data are shown.

Directory of Beehive Coke Plants in the United States.

Directory of Byproduct Coke Plants in the United States.

Directory of Coal-Gas Retort Plants in the United States.

Directory of Fuel-Briquetting Operations in the United States.

Directory of Packaged-Fuel Operations in the United States.

Directory of Peat Producers in the United States.

List of Manufacturers of Machinery Used in Making Fuel Briquets and Packaged Fuel.

Producers of Liquefied Petroleum Gases.

Dozens of statistical releases presenting preliminary and final data on production, consumption, stocks and foreign trade in various minerals.

Mineral Market Reports

These mimeographed releases, which give preliminary annual figures as soon as available, cover all subjects in the Minerals Yearbook.

Co-operative Publications

(Order from the co-operating agency)

Issued by Illinois State Geologic Survey, Urbana, Ill. Fluorspar (1938) 50¢.

Issued by Bureau of the Census, Washington 25, D. C. Facts for Industry Series 6-3 (monthly), covering about 20 chemical products of mines, coke ovens and smelters. (Free.)

Issued by Works Progress Administration, Washington 25, D. C. Mineral Technology and Output—Per-Man Studies. (Free.)

E 4 Mines and Quarries, 1935 (1937)
E 5 Cement Manufacture, 1909-1935 (1938)
E 6 Grade of Ore (1938)
E 7 Phosphate-Rock Mining, 1880-1937 (1938)
E 8 Crushed-Stone Industry (1939)
E 9 Bituminous-Coal Mining Vols. I & II (1939)
E10 Petroleum and Natural Gas (1939)
E11 Rock Drilling
E12 Copper Mining
Industrial Research and Changing Technology (1940)

Issued by State Metallurgical Laboratory, Pullman, Washington. Present Outlook for a Magnesium Industry in the Northwest (1937) 35¢.

Issued by McGraw-Hill Book Company. Mineral Raw Materials (1937) 342 pages, $5.00.

Dept. of Interior

(*Continued from page 585*)

stocks of vitamin A livers and oils. It also contains comparative information for previous years and production indexes. This bulletin is the most complete source of current fishery information.

Canned Fish and Byproducts. — An annual summary of the production and value of canned fish and shellfish and fishery byproducts (meal, oil, shell-products, kelp products, fish glue, etc.). Canned products are tabulated by style of pack, can size, and area of production. Historical summaries are shown for important items and data included on the number of plants preparing individual products.

Fish Meal and Oil.—A monthly summary of the production of fish meal and oil. Each issue contains a review of some phase of the fish oil or meal industry.

Vitamin A.—A monthly summary of the receipts of fish livers and viscera, stock production, receipts, and shipments of vitamin A liver oils and concentrates with comparative information for previous periods. Also contains data on government purchases of vitamin A fish-liver oils and concentrates.

Manufactured Fishery Products.—An annual summary of the production and value of all manufactured fishery products—canned, cured, byproducts (including liquid glue), packaged fish, packaged shellfish, and fishermen's prepared products. All products are classified by species and type of product.

Imports and Exports of Fishery Products.—An annual summary of United States foreign trade in fishery products. The bulletin lists the quantity and value of each item of fishery products imported or exported.

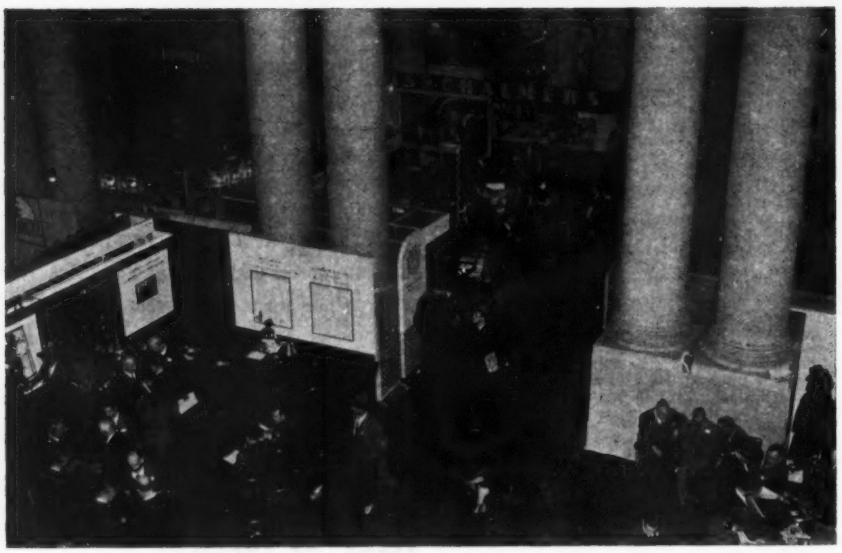
Lists of Manufacturers of Fishery Products.—The Fish and Wildlife Service maintains complete lists of firms manufacturing fishery products and lists are available free upon request.

Catalog of Reports of all types.—Superintendent of Documents, Washington 25, D. C. "Price List 21—Fish and Wildlife."

First Postwar "Chem Show"

Newer, Bigger and Better

EDITORIAL STAFF REPORT



NOT ONLY was the latest Chemical Exposition the largest but the exhibits showed a very refreshing upswing in quality. Further the increasing number of chemical companies exhibiting at the show gave a much better balance to this 20th Exposition of the Chemical Industries.

NEW ITEMS, more items and better exhibits featured the Twentieth Exposition of Chemical Industries held in New York from February 25-March 2. As in all large undertakings (nearly 400 booths) it is difficult to detect any major central theme in the Show. However, several interesting trends were observed.

First if the introduction of the many Junior models of standard equipment is indicative, the process industries will be doing much pilot plant scale research these next few years. If so, it is quite possible that the record number (about 625) of new chemicals developed by industry over the past two years and shown at the Chemical Industries booth will be a past record at the time of the next show.

Another trend is the increasing attention that is being paid by the equipment manufacturers to show exactly how their devices operate by such means as the application of a glass cover at the proper spot, cut-away models, or other means.

Still another important note is the increasingly large proportion of the space being occupied by manufacturers of chemicals, making this a better rounded "Chemical Show."

Although the following cross-section is admittedly incomplete, it is hoped that, insofar as possible, it will provide a representative survey of the contents of the many booths at the Show, particular stress being placed on the more recent developments.

The following discussion has been broadly divided into two categories, Equipment and Chemicals, with the Equipment section being further subdivided into Instruments, Pilot Plant Equipment, and Heavy Equipment.

EQUIPMENT

Many exhibitors utilized the Show as a place to publicly announce the new devices that they may have developed during the last few years, although many organizations have had their normal research and development programs very much muddled, if not stopped completely, by the press of wartime production.

INSTRUMENTS

Instruments of all types were shown, ranging from a new model electron microscope, requiring fewer tubes, exhibited by the Radio Corp. of America to an improved apparatus for the determination of CO, shown by the Lindberg Co. Other new analytical instruments included a device of Industrial Instruments, Inc. for the continuous recording and measurement of halogenated hydrocarbons, a new line-operated continuous pH meter of Cambridge Instrument Co., and a device for detection and measurement of oxygen impurities in gases shown by Baker and Co., Inc. Other new devices include the American Instrument Co.'s new electric hygrometer and RCA's electronic metal detector.

A specific gravity indicator and viscosity indicator were displayed by the Schutte and Koerting and Fischer and Porter Co. respectively. Fischer and Porter also showed a new electronic-actuated flow controller for low flow rates and a new external expansion type of temperature control was shown by the Burling Instrument Co.

A new super-sensitive leak detector (Chemical Industries 58 413 (1946), based on the mass spectrometer principle was exhibited by the General Electric Co. while the North American Philips Co. and the Picker X-Ray Corp. featured equipment for X-ray diffraction studies.

PILOT PLANT EQUIPMENT

Smaller versions of existing types of equipment and new types of apparatus especially well adapted for pilot plant scale operation were in existence at several booths. The Bowen Engineering Corp. featured their table model spray dryer and a new junior model filter was shown by the Niagara Filter Co. The Fansteel Metallurgical Corp. featured a new tanta-

lum pilot plant size absorption unit while Fischer and Porter exhibited a flow rate controller adapted to controlling flow rates down to 5 cc. per minute. The Pulverizing Machinery Co. exhibited a new smaller model of their Mikro-Atomizer.

HEAVY EQUIPMENT

New developments in disintegrating equipment include a colloid mill developed by the C. O. Bartlett and Snow Co., the Bradmill of the Pennsylvania Crusher Co. for the processing of plastics from bulk to powder, and the new "High-Efficiency" ball mill of the H. K. Porter Co.

A new expansion type cooler, using Freon as the coolant was featured by the Patterson-Kelley Co., while the Worthington Pump and Machinery Co. exhibited a tank designed to form a uniform suspension of a solid in a liquid by utilization of the directed inlet flow of the liquid. A variable speed drive capable of speed variations of 16-1 was also shown by the same organization. Alsop Engineering Co. was exhibiting a new line of stainless steel, fully-enclosed filters with capacities varying from 1 gal to 2000 gals. per hour and a series of improved mixers. An agitator of the side-entering type was shown by the H. K. Porter Co., while the Allis-Chalmers Co. had a new solids-handling pump on display. By this new construction the entire rotor can be removed without disturbing the piping arrangements.

%Proportioneers, Inc.% exhibited their new liquid feeder for metering a small volume of liquid into a much larger volume of liquid. The Schutte and Koerting Co. featured a packaged vacuum unit and ejectors constructed of Karbate or plastic. The Haveg Corp. has introduced a new furane type resinous construction material (Haveg "60") with increased resistance to corrosion, while the Bird Machine Co. featured their improved continuous centrifugal filters of the solid bowl type. The Lukens Steel Co. exhibited a new steam-heated platen constructed by utilizing their new method of ply construction, and the Syntron Co. had a model of their self-contained gasoline hammer on display. Welding Engineers, Inc., featured their device for the preparation of the large tonnage quantities of catalyst pellets, such as those required by certain of the modern petroleum catalytic cracking processes.

The Barco Manufacturing Co. featured a new type of coupling for the connection of non-coaxial shafts and a joint for the isolation of sound being carried by pipes, while the Norton Co. featured a series of recently-introduced line of pure oxide refractories. The National Carbon Co. featured several devices which have recently been adapted to construction with Karbate. A series of new high-temperature alloy castings for parts requiring high strength at high temperatures were on display at the booth of the Haynes Stellite Co.

CHEMICALS

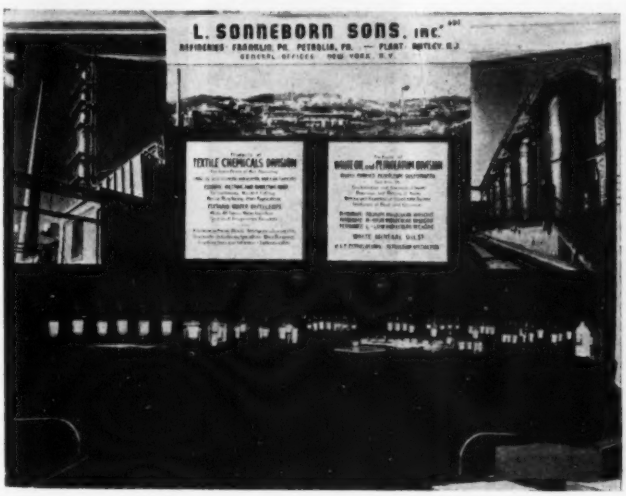
Although manufacturers of equipment continued to occupy the greater proportion of the space at this year's Exhibition, it was evident that more chemicals and chemical products were shown than in previous years. Since the industry is concerned not only with equipment, but also with materials to put in it, the show presented a better balance to the visitor.

The majority of chemical exhibitors emphasized the "institutional" aspect. That is, they did not confine themselves to a simple display of their products, but rather attempted to show where the products fit into the general picture of industry.

The following survey is not meant to be comprehensive. It is not feasible to attempt to describe all of the chemical exhibits at the show, and some of the newer developments have undoubtedly been omitted. A representative cross-section is presented here, however, with emphasis on some of the interesting and important new materials.

ATOMIC ENERGY

Probably the most interesting chemicals featured at the recent Exposition can't be bought by anyone at any price—uranium 235 and plutonium. The American Chemical Society exhibit featured a graphic description, replete with charts and diagrams, of the preparation and fission of these chemicals which have changed the history of the world. The lines of visitors at the booth would lead one to believe that nylons were being sold there.



Another chemical, also very much in the public eye, was featured both by Chas. Pfizer & Co., Inc., and Commercial Solvents Corp. They exhibited samples of penicillin, the purification of which has been worked out so that the material is creamy white rather than yellow. Pfizer also featured a flowsheet of penicillin production.

Pertinent to the production of antibiotics related to penicillin was the display by Sheffield Farms Company's Chemurgic Division of new milk products, peptones, used in mold culture and for sterility testing. The two products are N-Z-Case and N-Z-Amine. Ferric lactate is a new product the company has developed for fortification of infant food; another lactate, copper lactate, has an entirely different kind of use in metal plating to produce various colors.

Speaking of metals, a lawnmower and wheelbarrow fabricated largely from magnesium were prominently featured by the Dow Chemical Co. They were at the front of the booth near the aisle so that the passer-by could gauge their lightness by lifting them.

Also in the metals field was the display of the Lithaloys Corp. In addition to the hydride and other derivatives of the metal chiefly used in the manufacture of alloys, lithium amide holds great interest as a catalyst for organic reactions. Another curiosity, now commercially available, is diborane, the boron analog of ethane.

Returning to biological products, amino acids were shown by Sheffield Farms and by Winthrop Chemical Co. The former firm showed Edamin, its new protein hydrolysate from lactalbumen, and Winthrop showed very graphically the results of tryptophane deficiency. White rats on normal and trytophane-free diets manifested very noticeable differences in appearance, activity, and general well-being. Although tryptophane occurs naturally in many proteins, it is now being made synthetically.

Among the synthetics which show promise as pharmaceutical intermediates are the new compounds shown by Evans Chemetics, Inc. These range from substituted diamines to phenanthrolines.

PETROLEUM

In keeping with the increasingly important trend of petroleum companies entering chemical production, Phillips Petroleum Co. was displaying cyclohexane obtained from petroleum fractions, and a line of aliphatic mercaptans and disulfides which have shown promise as lube oil additives. This company also exhibited a new, synthetic odorless naphtha and several very pure hydrocarbons.

Socony-Vacuum Oil Co. pictured in their booth the extent of the variety of products available from petroleum and gave away samples of used bead catalyst in an effort to find a practical use for the material.

"Action" displays were used both by Amecco Chemicals, Inc., and Hardesty Chemical Co. The former illustrated the utility of chlorinated paraffins incorporated in coatings for flame proofing of wood, cloth, and paper. Treated samples of these were subjected to burning to demonstrate the coating's usefulness. Hardesty had samples of rubber compounded with its new plasticizer immersed in a dry ice bath to show how low-temperature flexibility is retained.

At the Atlas Powder Co. booth, one was reminded of the current stocking shortage by the display of a new rayon stocking size, developed in conjunction with and sold through American Viscose Corp.

Polyethylene, the comparatively new plastic which was used extensively in the war as an insulation material, was featured by the Bakelite Corp. On display were samples of cable insulated with this material.

A novel device whose potentialities have not yet been thoroughly explored is the ultrasonic generator shown by Fisher Scientific Co. and Eimer and Amend. The machine was in operation at their booth, emulsifying mercury in distilled water without the aid of a dispersing agent.

Heat Stable Penicillin

An important milestone in the advance in penicillin technology is marked by the announcement of the commercial production of heat stable crystalline sodium penicillin by the Commercial Solvents Corp. The product has a potency of the order of 1400 to 1500 units per milligram, as compared with a potency of 900 to 1000 units per milligram for the present amorphous preparations. The increased heat stability is such that the necessity for refrigeration of the drug, which has heretofore provided a serious shipping and storage problem, is eliminated, as are the dangers of the drug losing its potency which now prevent a physician from keeping a supply in his bag at all times for emergency usage.

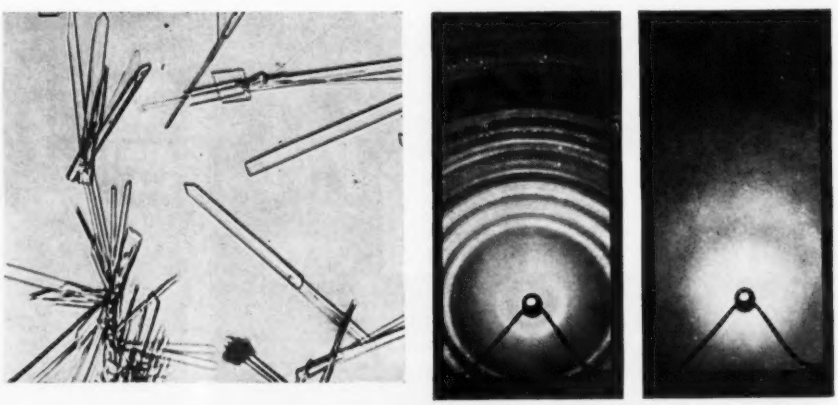
This advance is made possible by the introduction of special crystallization processes in the final production stages of the process as it is now constituted. The producers have stated that their plant at Terre Haute, Ind., will soon be producing the new crystalline form exclusively.

Crystalline sodium penicillin is white in color and the needle-like crystals are easily visible under a microscope. Its crystalline nature is also shown by X-ray diffraction patterns. Both the crystals and the X-ray diffraction spectra of both the crystalline and amorphous forms of penicillin can be seen in the accompanying illustrations.

According to Dr. Lawrence W. Smith, medical director of the Commercial Solvents Corp., the increased purity of the crystalline product has a number of medical advantages as, in general, the treatment of the usual pyrogenic infections (those due to the gonococcus, meningococcus, staphylococcus, streptococcus and pneumococcus) has been shown to be effective in direct proportion to the purity of the drug.

Again, because of increased purity, larger doses are tolerated in the aerosol treatment of upper respiratory infections (sinusitis, pharyngitis, tonsillitis, bronchitis, tracheitis, bronchiectasis, lung abscess).

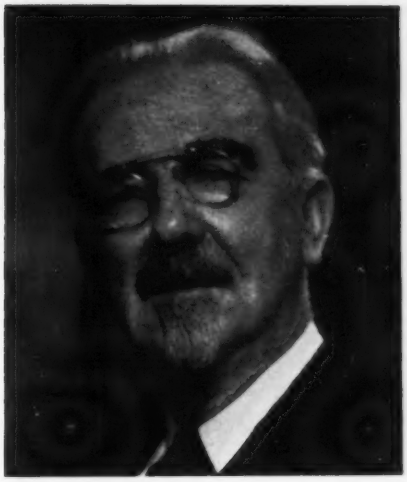
In the treatment of infections of the meninges by direct injection into the spinal canal, correspondingly larger doses are tolerated without evidence of nervous system irritation. This is directly dependent upon purity. Further, the high potency product permits use of subcutaneous injection instead of the present method of intramuscular injection, impossible with the low potency material because of the attendant discomfort.



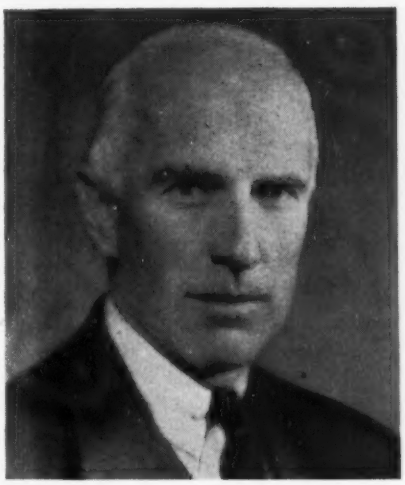
Left to right: First, crystals of the new heat stable penicillin sodium; Second, X-ray diffraction photograph of the new crystalline material; and, Third, an X-ray diffraction photograph of the less stable amorphous penicillin sodium, which is the form in which it has heretofore been marketed.

HEADLINERS in the NEWS

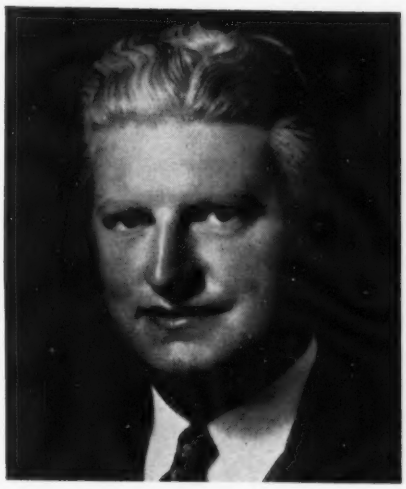
ROGER ADAMS, head of the Dept. of Chemistry, University of Illinois, awarded the Royal Society's Davy Medal in recognition of his organic chemistry researches.



WALLACE P. COHOE will receive the Messel Medal of the S. C. I. at London, Eng. in July. Dr. Cohoe is the third U. S. scientist so honored in the past eighteen years.



LAWRENCE W. SMITH, formerly Temple University professor of pathology, has joined Commercial Solvents to direct medical research, mainly in the field of antibiotics.



RALPH HENDERSON, former vice-president in charge of plant operations for Wm. R. Warner Co., has joined the executive staff of Frederick Stearns & Co., Detroit.

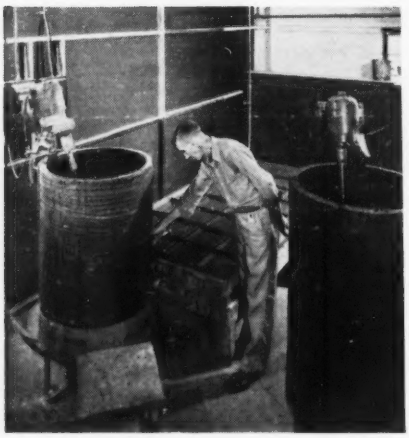
WILLIAM T. NICHOLS, appointed technical sales director of Westvaco Chlorine. He will supervise the recently consolidated technical sales, service, and development departments.

HARVEY W. GILBERT of du Pont, awarded the 1946 Schoellkopf Medal for his work in sodium technology and development of the sodium hydride metal descaling process.

HOWARD E. FRITZ, advanced to research vice-president by B. F. Goodrich. Joining the company in 1925 he played a major role in polyvinyl chloride developments.

J. H. REMICK Jr., appointed vice-president of E. & F. King & Co., Boston. A WPB Advisory Committee member during the war, he was formerly with Wyandotte.

How Chemicals Aid in Revolutionary Precision Casting Process



1 The waxes used in precision casting are blended in kettles and molded in blocks. Low ash and uniform shrinkage are prime requirements.

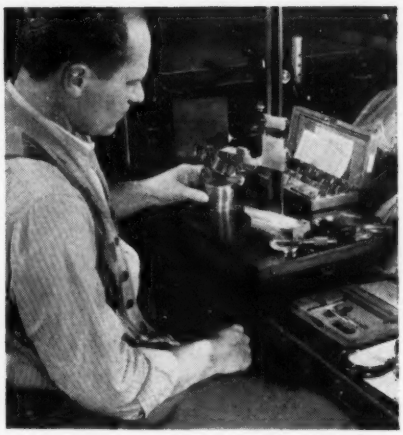
A new process, which has been brought to mass production status by the Haynes Stellite Co., Kokomo, Ind., holds dual significance for the chemical industry. In the first place novel use has been made of waxes and ethyl silicate, and secondly, the process opens up new frontiers for the manufacture of chemical processing equipment parts.

The precision casting method, or "lost wax" process, makes possible, for the first time the fabrication of intricate shapes from high temperature alloys, which it would be impossible or prohibitively costly to make by machining or forging. Die casting has met such needs with low temperature alloys but the described process permits more accurate casting of metals melting up to 2600 F. Working tolerances are as low as 0.003 inches.

The pictures, numbered in sequence, outline the fundamental operations. Although still experimenting with wax compositions the blend being used at present is mainly candelilla and Halowax, which is injected into the molds at about 68 C. and 4000 lbs. per sq.inch. The material packed around the wax pattern—called the "investment"— is applied as a slurry of fine silica suspended in ethyl silicate, which solidifies to a firm, gel-like consistency. Passed through gas furnaces on a travelling grate (1300-1900 F.) the wax and silicate are burned out to set the silica into a refractory mold. These molds must be broken to remove the alloy castings and no effort is made to reclaim the material.

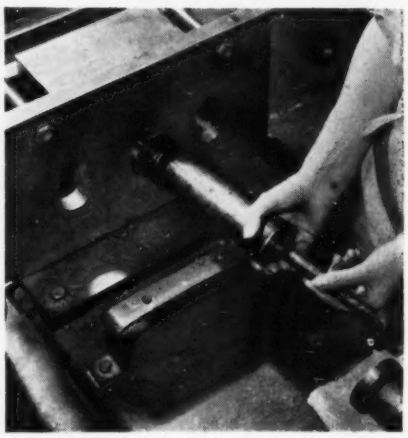
Operated originally for the production of turbo charger buckets—(2,100,000 a month) —more recent applications have been in the manufacture of temperature- or corrosion-resistant parts for chemical and rayon equipment, diesel and pulverizing machinery components, and rock drills.

Although the process cannot compete in many instances with ordinary screw machining, or forging, it materially broadens the range of special alloy intricate shapes available to the design engineer. Basically, it extends the field of metals application, and complements existing methods.

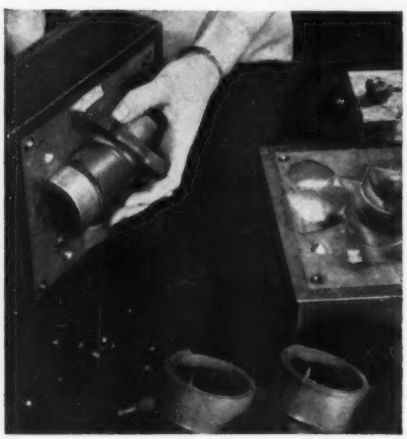


2 From the blueprint a master pattern is made from wood or metal. It is a replica of the desired piece plus 1.5 per cent shrinkage allowance.

3 Plaster molds are used to make a soft metal injection die from master pattern. Negatives of the latter, the cavities are duplicates of pattern.



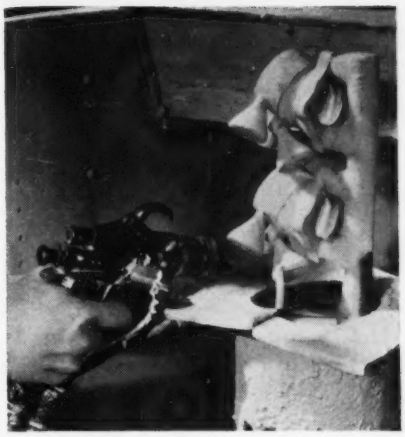
4 Necessary cores are placed in the die and hot wax is injected by means of a pneumatic ram gun. Dies have one to twenty cavities.



5 Wax patterns are removed from the die, cores removed, and wax gates manually broken off. These are direct counterparts of master pattern.

6 Wax "master patterns" are assembled by "wax welding" to requisite gates and risers. This is a conveyor belt operation.

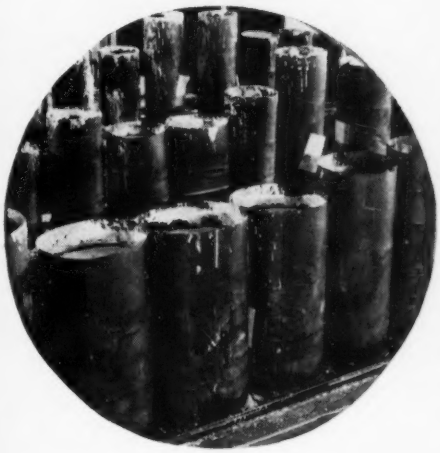
7 The assembly is dipped in special silica slurry. Silica must be fine mesh since this surface is next to molten metal and governs quality of finish.



8 Pouring end of assembly is mounted on steel base and sprayed with silica flour. Slightly coarser silica is later screened on—or "stuccoed."

9 Stuccoed mold assembly is carried through a dehumidifying tunnel. This drying process, which must be carefully controlled, takes 22 minutes.

10 Hastelloy C alloy flask is sealed to base plate with wax to render it liquid tight. Flask is in wax paper roll to hold excess "investment" material.

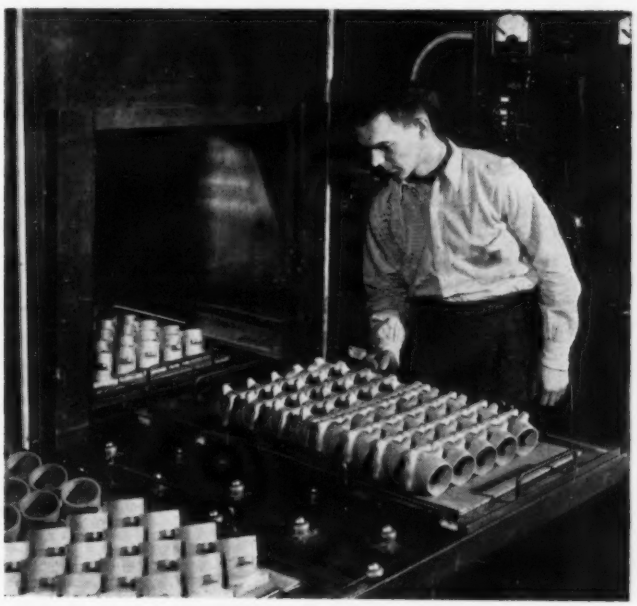


11 Filled with silica-ethyl silicate slurry, molds are placed on vibrator table. One hour treatment eliminates air and packs mix tightly around patterns.

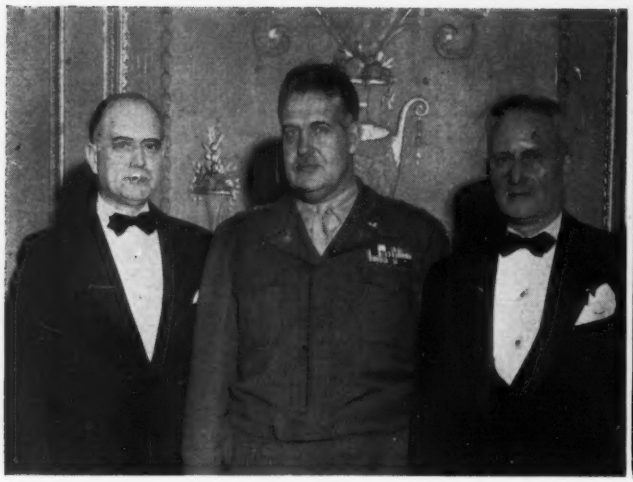
12 Completed molds, with wax pattern in center, are placed upside down in continuous furnace. Wax is burned out; silica refractory forms.

13 Metal to be cast is poured directly into hot mold. Air pressure ejection is used for thin edge casting and to improve soundness of products.

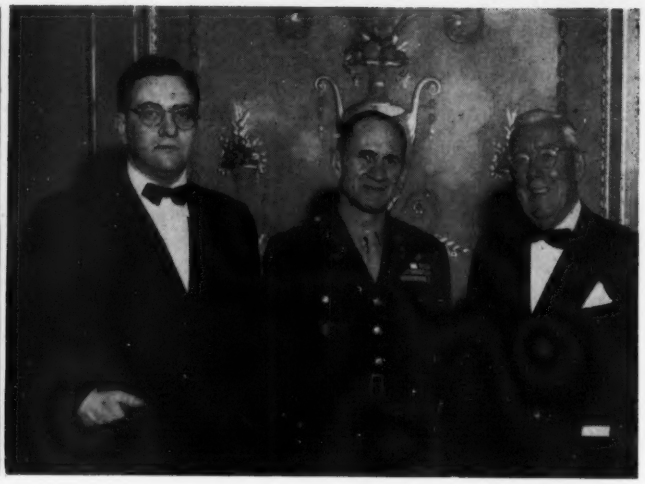
14 The mold is allowed to cool slowly and after about four hours the entire casting assembly is knocked from the mold. The excess "investment" material is removed and castings are shot blasted or trimmed by cut off wheels.



15 Trays of castings, after surface finishing, are checked dimensionally and subjected to Zyglo inspection—a penetrative oil test to reveal surface imperfections. X-ray examination, shown above, constitutes the final inspection.



A. B. Benson, McKesson & Robbins, Inc., president of the National Wholesale Druggists' Association; Maj. Gen. Leslie R. Groves; and E. T. T. Williams, Becton, Dickinson & Co., program committee chairman.

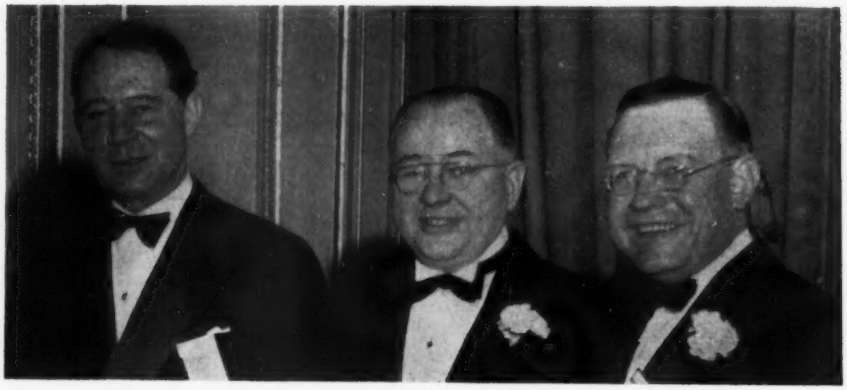


Harold M. Altschul, Ketchum & Co., DCAT chairman; Maj. Gen. Alden H. Waitt, chief, Chemical Warfare Service; and Ralph E. Dorland, Dow Chemical Co., president of the New York Board of Trade.

DCAT's 20th Annual Dinner

Over 2200 persons, representing more than 650 firms comprising the Drug, Chemical and Allied Trades Section of the New York Board of Trade, met at the Waldorf-Astoria on March 14 for the Section's 20th annual dinner. The main speaker of the evening was Major General Leslie R. Groves, director of the atomic bomb project, who paid tribute to the scientists responsible for the development and discussed the implications of releasing technical knowledge relating to atomic energy. Chairman of the Section Harold M. Altschul acted as toastmaster and Vice-Chairman Carle M. Bigelow honored the 150,000 employees of the member firms who have served in the armed forces. Dinner arrangements were in charge of Robert B. Magnus.

The 650 member firms of the Section are divided into 16 categories of the drug, chemical, cosmetic and related fields. Chairman Altschul in his remarks outlined the growth of the Section, which has doubled in size in five years, and emphasized the activities of the organization in advising upon legislation, issuing a bulletin, maintaining a Washington representative, and in general promoting the interests of the trade through luncheon forums, procurement of speakers, and all of the services usual in a trade association.



Above, V. E. Williams, Monsanto Chemical Co.; John A. Crozier, president, Federal Wholesale Druggists' Association; and S. B. Penick, Jr., S. B. Penick & Co. Below, L. I. Volckening, Ivers-Lee Co.; Carle M. Bigelow, Calco Chemical. and R. B. Magnus, Magnus, Mabee & Reynard.

Stephen L. Mayham, Toilet Goods Association vice-president; E. L. Newcomb, NWDA vice-president; H. L. Brooks, Coty, Inc., Toilet Goods Assn. president; and E. Allen Newcomb, NWDA secretary.

William Schilling, Jr., Norda Essential Oil & Chemical Co., Essential Oil Association president; and Ray C. Schlotterer, Association and FWDA secretary.

Monsanto phosphorus and related products

- Phosphorus (Yellow)
- Phosphoric Anhydride
- Phosphoric Acid-Tetra
- Phosphoric Acid—85%
- Phosphoric Acid—75%
- Monosodium Phosphate
- Disodium Phosphate (Anhydrous and Duohydrate)
- Trisodium Phosphate
- Sodium Acid Pyrophosphate
- Tetrasodium Pyrophosphate
- Ammonium Phosphates
- Calcium Phosphates (Mono-Di-Tri)
- Calcium Pyrophosphate
- Potassium Phosphates
- Magnesium Phosphates
- Sodium Iron Pyrophosphate
- Iron Orthophosphate
- Ferro Phosphorus
- Alkyl Phosphoric Acid
- Alkyl Phosphates

Monsanto phosphorus better than 99.9% purity

Better than 99.9% pure phosphorus

Monsanto phosphoric acids and phosphates exhibit a uniformly high quality that is supported by the near-absolute purity of Monsanto's elemental phosphorus — better than 99.9%. Because of this, many industries look to Monsanto as their prime source of supply.

Since Monsanto is the world's largest commercial producer of elemental phosphorus, it follows that the value of its experience with phosphorus and its derivatives is often of great value. Users are invited to contact the nearest Monsanto Office, or write MONSANTO CHEMICAL COMPANY, Phosphates Division, 1700 South Second Street, St. Louis 4, Mo. District Offices: New York, Chicago, Boston, Detroit, Charlotte, Cincinnati, Birmingham, Los Angeles, San Francisco, Seattle, Montreal, Toronto.

MONSANTO CHEMICALS

SERVING INDUSTRY...WHICH SERVES MANKIND

BETWEEN THE LINES

Lower Leather Exports Foreseen

Although the skill and technical efficiency of the U. S. leather industry is high, its products will have to compete in the export market with inferior but cheaper leathers from India and South America. Our export market has never been large compared to domestic demand, but if American purchasing power declines, foreign sales will loom more important.

PROBLEMS relating to hides, skins, and leather in the postwar period will be quite different from those confronting many of the war expanded industries.

This conclusion is indicated by a summary of conditions now found and some projection of developments arising during the war. As in the case of other industries considered in this department, the most comprehensive current data is to be found at the U. S. Tariff Commission, as a result of its assignment to prepare detailed commodity and industry surveys which will come into use somewhat later when reciprocal trade and tariff arrangements again become cogent. Running this agency a close second in its knowledge of current trends are the commodity experts temporarily in the Office of Price Administration, brought in from actual business offices and firms dealing in the fields under discussion. From these and other sources, certain highlights in the leather industry are worth attention at this time.

There was a considerable expansion in production of leather in this country, obviously, but with very little addition to plant capacity and with no Government advances of capital for such expansion. Existing facilities were utilized to the maximum, the work-week lengthened, and the tanning processes speeded up. This, incidentally, led to some concessions on quality of the resulting product, but quantity was at a premium. There was even relatively little private investment in expanded plants. As a consequence, postwar problems of excess capacity or disposal of plants are not particularly pressing in this industry.

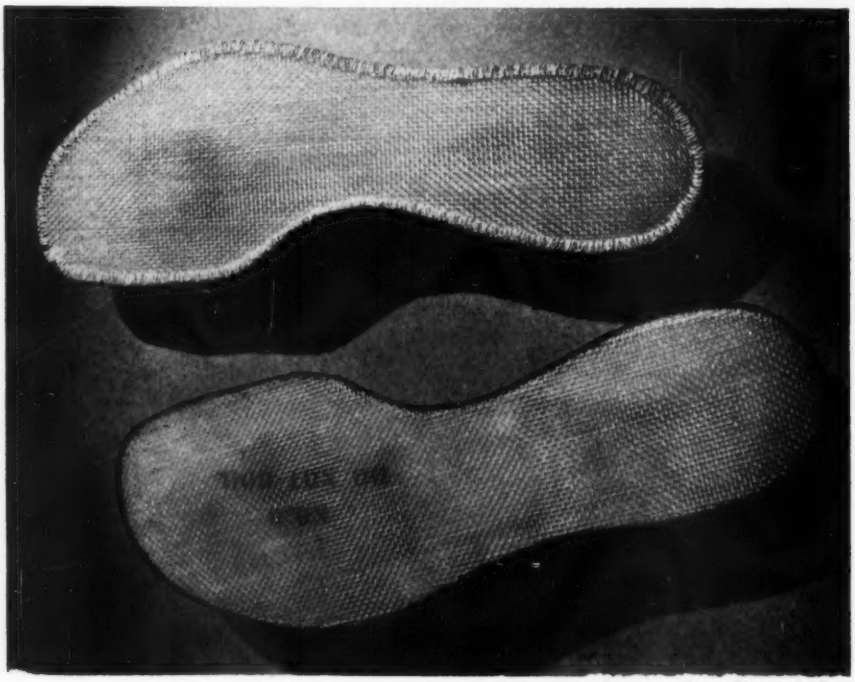
The industry does face another situation—the prices of raw materials entering its production. In the United States tanning industry, and referring specifically to factories as distinguished from contract establishments working on materials furnished by others, the cost of materials, as of 1939, represented 67.1 per cent of the total value of the finished leather, the bulk of which cost was, of course, the hides and skins, although tanning materials represent a considerable factor. This ratio is comparable with 49.7 per cent in chemical and allied products; 77.1 per cent for petroleum and coal products, and 36.7 per cent for stone, clay and glass products, or 56.5 per cent average for the ten principal U. S. industries in 1939.

There has been an increasing stringency in the tanning materials most generally used—waxes, bark extracts, both imported and domestic—since war days. A declining production led OPA recently to advance prices for chestnut wood in bolts for bark extraction and other chemical uses, as well as other chemical woods.

As a result, the OPA is currently in the process of making adjustments in prices of individual sellers of chestnut bark extract. These advances are being authorized to individual applicant firms, but there seems little reason to expect that they will not become general. Hence, there is in prospect a further rise in the ratio of costs to finished product for the leather industry in general, unless a drop in other costs should offset the jump in tanning materials.

In this general connection, according to the Tariff Commission's findings, "there was relatively little new technological development during the war."

It is also expected that if the shortage of hides and skins continues after the war, as now seems probable for at least several years, many substitutes for leather, now in use to a considerable extent, may be used in still larger quantities. Among these are rubber, natural and synthetic; plastics for use as soles and heels; cork, fabrics, felt, fiber, etc. Some of these may even permanently displace leather in certain uses, it is held.



(Courtesy Dow Chemical Co.)

Insoles made of a polyvinylidine chloride plastic. Rubber and plastics will find increasing use as substitutes for leather in special uses, but it is hardly expected that substitutes will displace leather in the majority of its major uses.

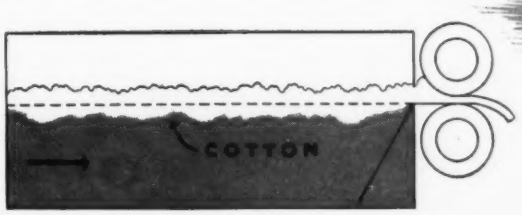
Export Demand

In any case, it is anticipated that for at least the first two or three years after the war the demand will continue to be extremely heavy, both as to the United States and Europe. In this country, the expected continued high level of national income will be a factor—in Europe, the absolute need, regardless of income, and the fact that part of such need at least appears slated to be met by relief processes.

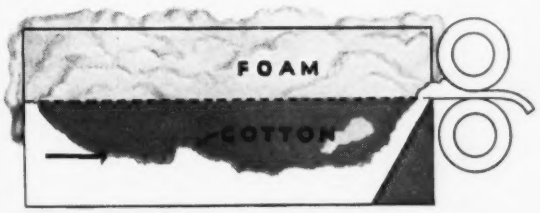
For the long-term postwar period, it is believed, prosperity of this country's tanning industry will depend more largely on the strength of the domestic demand. This represents no great change, as the bulk of their production has always been marketed at home. However, it is expected that this will be contingent on national income remaining high. If it level-

FIREPROOFING RAW COTTON

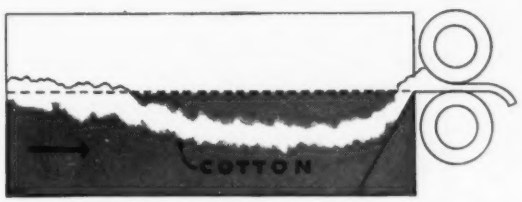
A problem of controlled penetration in a continuous process . . .



Without an efficient wetting agent cotton floats on surface all the way to the squeeze rolls. Uniform and effective penetration of fireproofing salts is impossible.



Uncontrolled penetration . . . usually accompanied by wasteful foaming . . . may cause cotton to sink to bottom of tank thereby impeding processing.



Controlled penetration with Victawet 35B produces practically no foaming. Cotton sinks just below surface . . . machine operates at maximum efficiency . . . rejects are eliminated.

Solved with

VICTAWET 35B

Problem—Because raw cotton is hard to wet, surface-active agents or penetrants which work effectively in the presence of fireproofing salts are required. During the war several plants experimented with various penetrants for this type of work. Some proved unsatisfactory because of excessive foam which wasted solution and made working conditions difficult. Others failed to control speed of penetration resulting in imperfectly fireproofed cotton and subsequent rejections.

Solution—Use of Victawet 35B was recommended by Victor's Research Laboratory. In practical tests, proper concentrations of this new Victor surface active agent provided efficient wetting with practically no foaming. Penetration was controlled so that the cotton sank just below the solution surface without collecting at the bottom of the tank. Speed of processing was stepped up as much as 25%. Production was perfect, and uniform results were demonstrated by flame tests on the finished goods.

Many other penetration problems have been solved with Victor surface-active agents. If you have a problem think first of a phosphate from Victor.

GOT A PROBLEM
THINK FIRST OF A **phosphate**
from **VICTOR**

VICTOR CHEMICAL WORKS

VICTOR CHEMICAL WORKS
Headquarters for Phosphates • Formates • Oxalates
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off at prewar figures, tanners will obviously be in a less favorable position.

Exports will not be as important, under a high-income position, as if the reverse situation occurs. Before the war, exports by U. S. tanners represented only about 3 per cent of domestic production. Because of wider postwar competition, it is now anticipated that exports will be even smaller. This competition is logically expected from Canada, the United Kingdom, France and the Netherlands, over the long-term postwar era, but relatively unimportant shippers prior to the war have now become potentially strong competition. These include Argentina, Brazil and India.

Brazil and India were expanding their leather industries even before the war. While these countries may not maintain the wartime level of production, there is reason to expect that their output will be larger than before the war, and they may develop a fairly important export trade.

Pertinent to the above discussion of relative costs, Argentina, Brazil and India not only enjoy advantages of large supplies of hides and skins, but have important resources in tanning materials. Argentina, of course, is the principal source of quebracho, the most widely used tanning extract in both the United States and other major leather-manufacturing countries. Argentina has always been a producer of high-grade hides and skins in addition to its unique position in quebracho. Brazil has abundant hides and skins, many important tanning materials, and has developed an important industry.

When all is said and done, however, the United States leads the world in both production and consumption of leather, and for all the small proportion of its output exported, is one of the leading exporters. This suggests another factor in the situation: skill and technical advancement.

Tanneries require a relatively high proportion of skilled workers. Skill has an important place in the quality of the product. In the case of countries more recently becoming serious contenders in leather production, it is expected that probably for some years they will lag behind the United States and perhaps other older producers, in technical proficiency—expertness on the part of management, technicians and workers. This industrial skill contributes to low costs, but more especially to the quality of the product. In the case of special leathers, requiring elaborate processing, the newer competition obviously will tend more to be in the lesser grade, more easily processed types. And even in the lower grades, the quality may be inferior to the same grades produced by the more established industries of this country and its ranking counterparts.

As an aside, anyone who has ever had experience with a pair of shoes or sandals tanned by some of the more primitive makers may recall the smells attached to the experience, which are due to local extracts used, inexpert treatment of leather, and other such causes. The result, however, is distinctly not contributory to sales appeal.

This lack of skill is, of course, offset in a large measure by the prevailing lower wage scales in some of the other countries, and the initially lower costs of the hides and skins.

Two main groups of tanning processes are in general use: vegetable tanning and mineral tanning. Vegetable processes are most widely used for heavy leathers, including belting and sole leather. This means use of quebracho, chestnut, wattle, oak, hemlock and other barks from which tannin is extractable. Tanning of heavy leather usually requires from 2 to 4 months. Mineral processes are used for upper and lining leathers most frequently, and for glove and garment leathers. This is called chrome tanning, the processes varying according to the leather. However, all utilize one or more salts of chromium, principally chrome sulfate and bichromate of potash or soda. Tanning of lighter leathers usually requires 1 to 3 weeks. Synthetic tanning agents are now on the market, incidentally.

Substitutes

This suggests the place of substitutes for leather, in the picture. At present the principal substitutes are rubber and certain plastics, used chiefly as sole material. Fabrics and fibers are used for various articles formerly confined to leather. The use of plastics and rubber gained during the war, even though these materials, in turn, were scarce. If a leather shortage persists in the coming years, it is foreseen that these substitutes may gain wider hold in the manufacturing end. However, say authorities, it is doubtful if the substitutes now known will become seriously competitive with leather. On the other hand, it is conceded, research in this field doubtless will continue, and in time, may produce new substitutes with characteristics more nearly like those of leather, and hence, more seriously threatening leather's position.

Even so, it is added, an increase in the use of substitutes would still have more of an effect on the price of leather, and on prices of hides and skins, than on the quantity of leather used. There is little possibility, it is held, that production of hides and skins in this country, or over the world, will ever be seriously affected by the use of increased amounts of substitutes for leather.

Pittsberg Chemical Changes Corporate Name

The Pittsberg Chemical Co., Los Angeles, manufacturers of refrigerants, insecticides, and fumigants, has recently incorporated under the name of Eaton Chemicals, Inc.

CHLOROPHYLL

Water, Oil, Alcohol, Acetone soluble

PHEOPHYTIN

XANTHOPHYLL

PHYTOL

CAROTENE

Manufactured by

MIDWEST EXTRACTION COMPANY

Eastern Representatives

Welch, Holme & Clark Company, Inc.

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Hydrogel is an intermediate product in the manufacture of silica gel. It is a colloidal form of silicon dioxide . . . chemically active with alkalies. It has the physical characteristic of being "mullable".

Hydrogel has already found wide use as a vehicle for pharmaceuticals, as an extender, as a coating for paper and in the textile and wood-pulp industries. It may be the answer to your problem.

THE DAVISON CHEMICAL CORPORATION

Progress through Chemistry

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NEW PRODUCTS & PROCESSES

Metal Chelates for Oxygen Production NP 286

A NEW METHOD for obtaining pure oxygen from the air has been described by Dr. Melvin Calvin, associate professor of chemistry in the University of California at Berkeley, at a meeting of the California Section of the American Chemical Society.

Developed during the war, the process uses metal chelates and works on the same principle by which the blood in the human body takes oxygen from the air in the lungs and transports it to the tissues. Observation of this and similar natural processes enabled scientists to evolve the new synthetic method of oxygen preparation, which was first used in the South Pacific to produce oxygen needed for welding and other repair work away from the regular repair bases.

The chelate, in the form of red crystalline granules, is placed in a tube and a stream of air is blown through it. As the red granules absorb the oxygen, they turn black and begin to get warm. As they warm up, the rate of oxygen absorption decreases and the total amount of oxygen which they can absorb is decreased; therefore, the tube is cooled by a stream of water around the outside. After the crystals have absorbed all the oxygen they can, the stream of air is stopped and the cold water surrounding the tube is replaced with hot water or steam. As the crystals are warmed, they give off the oxygen and again become red. This oxygen may be used directly or collected in a storage tank. These crystals are now ready to absorb oxygen again, and this cycle can then be repeated thousands of times with the same crystals. By setting up several units so that some absorb while others give off oxygen, a continuous stream is obtained.

The metal in these compounds is usually cobalt, and the organic portion of the molecule is salicylaldehyde or a derivative thereof together with ethylenediamine, or a derivative, or certain polymethylene triamines.

Italians Use H_2O_2 To Purify Milk NP 287

Specially purified, metal-free, electrolytic hydrogen peroxide is now being used in Italy for the sterilization of milk. All milk in the Milan area is being treated by this method, and as soon as peroxide production facilities can be extended other areas will adopt the method. One maker hopes to produce the chemical in tablet form and has also experimented with the solid compound of hydrogen peroxide and urea.

Corrosion-Resistant Coating NP 288

A new protective coating said to be highly resistant to acids, alkalies, chlorides, oils, brine, oxygen, gasoline, and alcohol solutions, called Cotoid, has been developed by the Lithgow Corporation.

The application of Cotoid results in a tough, hard, elastic finish, which, after air or force drying, is tasteless and odorless. It has been found practicable for protecting walls, wood or steel structural work in food processing plants, wineries, breweries and paper mills. It can be used for coating inside and outside surfaces of concrete, steel, or wooden tanks used for corrosive solutions, brines and alkalies. It has been laboratory tested for use with a wide range of acids, gasoline, sour crudes, and lye solutions.

Cotoid will withstand a maximum temperature in air or vapor of 220° F. Maximum submerged temperatures approach 150° F. It will not crack under temperatures as low as —20° F.

Plastic-Like Construction Material NP 289

A new construction material, somewhat in the nature of a plastic composition, has been announced by Research for Industry, Inc. The product, according to Dr. Waldemar Dietz, executive director of the organization, will solve the problem of many manufacturers who now cannot obtain sufficient materials.

The product, known as Excelite, is made of materials which are easy to obtain even with the present shortages. Its relatively high strength, low conductivity of heat, low manufacturing cost, good resistance to fire and fine appearance make it applicable to many fields where metals or plastics now are used.

Materials used in the construction of the product, which has undergone a series of intensive tests, are a major proportion of wood wool "excelsior", water, a small amount of alkaline metallic salt, soy bean protein and quicklime.

This material may be molded in any density from 4 to 50 pounds per cubic foot, depending upon the pressure used. It can be produced in any form for which a mold may be made and in any thickness from 1/16 inch to 6 inches.

Beside molded products, applications for which the material is suited include insulating building boards, doors, sash mouldings, gutters, veneer cores, air ducts, stove pipe, board liners, furniture, roofing, cabinets, refrigerator insulation, truck and bus bodies, caskets and coffins, containers and many others.

Fiberglas Mat to Reinforce Plastics NP 290

A new material designed for plastics reinforcement, known as Fiberglas Mat, Series X-30,000, has been announced by Owens-Corning Fiberglas Corporation. The mat is composed of continuous glass filaments bonded with a vinyl resin.

As the glass filaments are drawn and wound on forming tubes, they are lubricated with a compound that has a chemical affinity for the glass fibers as well as for the commonly used polyester-type

CHEMICAL INDUSTRIES TECHNICAL DATA SERVICE

CHEMICAL INDUSTRIES, 522 Fifth Ave., New York 18, N. Y. (4-6)

Please send me more information, if available, on the following items. I understand that none may be available on some of them.

NP 286	NP 290	NP 294	NP 298
NP 287	NP 291	NP 295	NP 299
NP 288	NP 292	NP 296	NP 300
NP 289	NP 293	NP 297	NP 301
			NP 302

Name ..... **Position** .....

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City & State .....

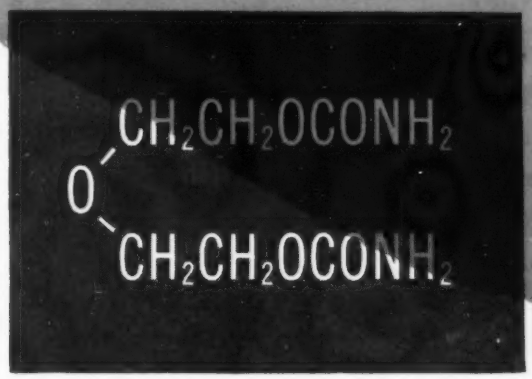
Columbia's Technical Staff

presents

the organic compound

Diglycol Carbamate

(DIETHYLENE GLYCOL DICARBAMATE)



Diglycol Carbamate is a white crystalline organic compound containing two carbamate groups. It is relatively insoluble in common organic solvents, but is soluble in water and polyhydroxylic solvents upon heating. It is relatively stable to acid hydrolysis, but is less stable to basic conditions.

Diglycol Carbamate condenses with formaldehyde to produce tough, colorless resins. Typical castings possess flexural strength values as high as 22,000 psi., and unnotched Izod impact strengths up to 10 ft. lbs. per inch. Water absorption values are apparently slightly higher than for similar urea resins.

Diglycol Carbamate co-condenses in urea-, melamine-, and phenol-formaldehyde resins, and may be used to modify these resins for improvement of properties such as flexibility and strength.

DATA AVAILABLE ON REQUEST—*Physical properties and specifications are available on request. If the description indicates potentials in which you are interested, please request samples on your company letterhead.*

COLUMBIA CHEMICALS

PITTSBURGH PLATE GLASS COMPANY · COLUMBIA CHEMICAL DIVISION

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COLUMBIA ESSENTIAL INDUSTRIAL CHEMICALS
Soda Ash • Caustic Soda • Liquid Chlorine • Sodium Bicarbonate • Pittchlor (*Calcium Hypochlorite*) • Silene EF (*Hydrated Calcium Silicate*) • Calcium Chloride • Soda Briquettes (*Iron Desulphurizer*) • Modified Sodas • Caustic Ash • Phosflake (*Bottle Washer*) • CalceneT (*Precipitated Calcium Carbonate*)

resins. The fibers are then cut off the forming tubes and separated into loose packs. Subsequently the packs are formed into mats bonded with vinyl resin.

A vinyl resin is used to hold the glass fibers in mat form because the resin may be softened either by heat or by solvents in the usual contact-pressure resins. This property makes it possible for the fabricator of formed parts, in which the mat is the reinforcing material, to form the mats by applying heat alone, or by impregnating the mat with the resin that is being used. Hence the laminator may choose either method to stretch the mat and form it to the contours of the mold.

dl-Isoleucine NP291

dl-Isoleucine has been added to the list of synthetic amino acids offered by Special Chemicals Division of Winthrop Chemical Company, Inc. Winthrop dl-isoleucine is manufactured by a process which insures that it is free from dl-leucine as determined by microbiological assay. dl-Isoleucine is one of the esssential amino acids required for growth and maintenance of all mammals. Its use has been suggested for the fortification of serum albumin, which is deficient in this amino acid.

Water-Mix Wall Paint NP292

The Glidden Company has announced the production and forthcoming marketing of "Spred-Luster", a revolutionary new top-quality oil-base enamel, properties of which permit the use of water as a thinning medium.

Exhaustive tests, the company reports, prove that "Spred-Luster" dries to a hard, satin-like finish, washes like a china plate (can actually be scrubbed if need be), and consequently is applicable to practically all types of rooms—including the kitchen and bath.

The ease and speed with which "Spred-Luster" can be applied, plus its quick-drying properties, should be of prime interest where the time required to repaint and reoccupy a room is of importance. A given area can be finished in about one-third the time required for the application of the older types of oil-base wall paints or woodwork enamels, while drying is accomplished in about two hours.

Plasticizing Oil NP293

Nevillac TS, a new plasticizing resin having very little odor and good color retention, has been placed on the market by the Neville Company.

A clear amber, resinous oil with a vague phenol odor, Nevillac TS is very viscous and slow flowing. It is soluble in practically all solvents except water, glycerine and higher polyhydric alcohols; and miscible with ethylene glycol and its di- and tri-derivatives. It is compatible with zein, cellulose derivatives, synthetic rubbers, terpene, alkyd, phenolic, vinyl and coumarone-indene resins.

This chemical is an excellent compounding material to use with zein as it imparts waterproofness and lasting flexibility to it. The resulting protein film retains its alcohol solubility, gloss and slick-feel.

Nevillac TS has an average molecular weight of 250. Specific gravity at 30.0/15.6°C is approximately 1.08. Refractive index at 25°C is 1.599. Distillation is essentially above 300°C with slow decomposition beginning at about 370°C.

Suggested uses for the new product are as a plasticizer, softener, impregnant, and for water-proof and grease-proof paper coatings.

Vinyl Stabilizer NP294

Stabilizer V-1-N has been developed by Advance Solvents & Chemical Corp. to prevent the discoloration and chemical breakdown of vinyl chloride and vinyl chloride-acetate copolymers when they are processed at high temperatures and exposed to light.

Stabilizer V-1-N, being a fluid liquid, can be readily incorporated in the vinyl resin when it is worked on a mill or in a Banbury. It is also compatible and soluble in vinyl resin solutions and can be used in lacquers and other solutions based on vinyl resins.

Stabilizer V-1-N permits the working of vinyl resins at high temperatures such as in the mill and calenders without decomposition of the resin and gives clear transparent films.

Zinc Bath Solution NP295

A new product, McKeon's "Zinc Brite," is a concentrated solution guaranteed completely to remove heavy metal ions such as copper and iron which usually interfere with the operation of alkaline zinc plating solutions.

The effect of McKeon's "Zinc Brite" on copper ion is not quantitative nor complete in the presence of cyanide and varies with the concentration of the cyanide.

Its liquid form assures even dispersion throughout the plating solution—insuring complete and effective treatment.

It has the distinct advantage that filtration following precipitation is greatly simplified.

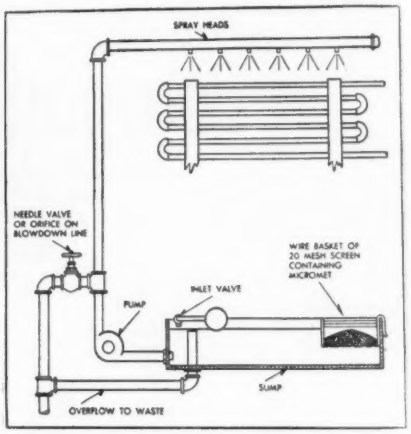
Wet-Strength Paper Resin NP296

A new resin for wet strength improvement of paper, Uformite 470, has been announced by The Resinous Products and Chemical Company. This represents an entirely new type of urea-formaldehyde resin modification, and requires no special handling, aging, or pre-treatment before use. After dilution with water it is ready for immediate addition to the stock prior to sheet formation. The resin represents an advance over previous types in that it offers superior retention and wet strength development on sulfite, rag, and groundwood stocks; high wet strength with all stocks at low acidity; effectiveness with minimum alum or acid alone as catalyst; and excellent durability of wet and dry strength.

Evaporator Scale Preventive NP297

Micromet, recently introduced to the market by its manufacturers, Calgon, Inc., is a modification of the chemical product, Calgon, designed specifically to eliminate scale formation in evaporators used in air conditioning installations.

Micromet is fed in small quantities to



the cooling water, preventing the deposition of lime scale on the tube surfaces. The make-up water for the condenser is passed through a bed of Micromet, dissolving only about 5 parts of the chemical per million parts of water. The original charge of the chemical is determined by the amount of make-up water to be treated.

The company has made recommendations on the amount of Micromet necessary for waters of varying hardness, as well as on the amount of overflow in proportion to evaporation. Average conditions use 4.3 lbs. of Micromet per 10 tons of refrigeration with an overflow/evaporation ratio of 1.5.

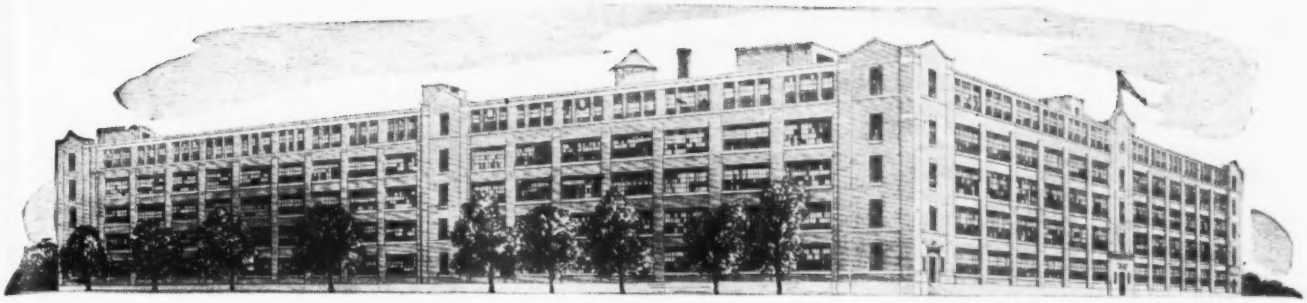
Micromet is a slowly-soluble phosphate glass made from food-grade phosphoric acid.

Wetting Agents NP298

Naybasols are new wetting agents developed by the Naylee Chemical Company.

The Naybasols are powerful wetting agents in that the strongly hydrophilic character of the solubilizing groups has been altered and intensified. This radical change gives the Naybasol pastes enhanced wetting, sudsing and detergent action.

At the present time the Naybasols are being used extensively in the processing of textile fibers and fabrics; synthetic latices and plastics; leather and paper



NO. 7 OF A SERIES OF DIGEST REPORTS FROM CYANAMID RESEARCH LABORATORIES

EXAMINE THE POSSIBILITIES OF THIS REACTIVE COMPOUND

AERO* ACRYLONITRILE

AERO ACRYLONITRILE, a low cost intermediate, was restricted to the production of synthetic rubber during the war years. Today, off allocation, it is available in tank-car lots for you to explore its vast range of possibilities. Illustrative of a few of the many reactions of this highly interesting compound are:

With hydroxy compounds—

$$R\text{-}OH + CH_2 = CH\text{-}CN \rightarrow R\text{-}O\text{-}CH_2\text{-}CH_2\text{-}CN$$

Included in this group are alcohols, phenols, and oximes...

With ammonia or amines—

$$RR_1NH + CH_2 = CH\text{-}CN \rightarrow RR_1N\text{-}CH_2\text{-}CH_2\text{-}CN$$

R and R_1 can be hydrogen or an aliphatic, aromatic, alicyclic, or heterocyclic radical...

With compounds containing active hydrogens—

$$RR_1R_2CH + CH_2 = CH\text{-}CN \rightarrow RR_1R_2C\text{-}CH_2\text{-}CH_2\text{-}CN$$

This group includes ketones, aldehydes, and esters...

Acrylonitrile will also react with halogens, mineral acids, compounds containing conjugated double bonds and numerous others.

The cyano group in acrylonitrile, or its derivatives obtained by the reactions outlined above, will undergo any of the typical nitrile reactions such as hydrolysis to an amide, acid or ester; or reduction to an amine.

AERO ACRYLONITRILE is a highly refined chemical. The boiling point of the pure compound is 77.3°C. It weighs about 6.7 pounds per gallon. It is miscible with most common organic solvents but only slightly soluble in water.

Further technical information regarding the reactions of acrylonitrile and samples of the material are available. Write to the Synthetic Organic Chemicals Department of the American Cyanamid and Chemical Corporation, 30 Rockefeller Plaza, New York 20, New York.

*Trade-Mark

American CYANAMID & Chemical Corporation

(A UNIT OF AMERICAN CYANAMID COMPANY)

HEADQUARTERS FOR NITROGEN CHEMICALS

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and pulp and water paints. Miscellaneous utilities are to be found in ceramics, dairies, cleansing and shampooing liquids, dyeing, non-metallic flotation agents and orchard sprays.

Lacquer Resin NP 299

A new economical lacquer resin, Cellolyn 102, to be used in place of rosin maleates with superior results in some characteristics, is now available from Hercules Powder Company's Synthetics Department.

Cellolyn 102, a rosin base resin, bypasses the current glycerine shortage and offers considerable economy in use.

Nitrocellulose lacquer films containing Cellolyn 102 possess better cold check resistant qualities than rosin-maleate—nitrocellulose lacquer films, with no sacrifice in print resistance or hardness of film.

The new resin is suitable as the resinous component of nitrocellulose lacquers for a wide range of industrial lacquer uses as well as for furniture lacquer finishing systems and in lacquer-primer surfaces.

Fabric Stabilized With Cellulosic NP 300

A raschel knit fabric in which the shape of the meshes and the width of the fabric have been set by use of a cellulosic material has been developed by Sidney M. Edelstein, technical director of Dexter Chemical Corp. and will be made available to the industry. This fabric is said to have stability against normal conditions of use and laundering.

New Wool Dye NP 301

A new addition to the Calco line of metallized dyes, Calcofast Wool Bordeaux RB Conc. is featured by the Calco Chemical Division, American Cyanamid Company. It is stated that the fastness to light of Calcofast Wool Bordeaux RB Conc. is very good and is equally fast to washing, sea water, and sea water spotting.

The all-around fastness properties of this new color recommends it particularly for the better grades of men's and women's wear, tropical suitings, knitting yarns, bathing and sweater yarns, and upholstery fabrics.

Silica Gels NP 302

The Davison Chemical Corporation of Baltimore has announced a series of special silica gels, called Tel-Tale, which by changes of color accurately indicate changes in relative humidity.

The original Tel-Tale silica gel was developed for use in Davison Dehydrated Packaging. During the war it was found necessary to have a sentinel within the sealed package. This would give warning if the relative humidity in the enclosed area went above the "safe" point due to failure in the moisture vapor-proof envelope.

Research on the part of Davison developed methods and controls whereby silica gel could be impregnated with cobalt chloride in such a manner that a dependable indicator resulted. Through a series of changes in color from deep blue to light pink, various relative humidities were recorded. This was incorporated in the Davison Humidity Indicator.

Later development and research expanded the number of silica gels impregnated with various chemicals, by various methods and controls, until today Davison offers a series that covers a wide range of relative humidities. These Tel-Tale silica gels promise a wide future use in industry where quick, accurate and economical indicators are needed.

Another Davison product which is finding wider use every day is hydrogel, an intermediate product in the manufacture of silica gel.

Hydrogel is a colloidal form of silicon dioxide and has the physical characteristic of being "mullable". An interesting chemical feature of hydrogel is its chemical activity with alkalies, thus giving it a wide use in the textile and wood-pulp industries. It has also found wide use as a vehicle in pharmaceuticals, as an extender, and as a coating for paper.

Aromatic Chemicals

IN INDUSTRY

THE field of Aromatic Chemicals in Industry has widened considerably in recent years.

NO longer is the use of Aromatic Chemicals restricted to the Soap, Cosmetic and Perfume Manufacturer.

AS industrial deodorants, aromatic chemicals are widely used in the production of rubber, paper, textile, paints and in many household, agricultural and industrial specialties.

FURTHER research is constantly being made by us to improve and widen our lines of Aromatic Chemicals.

PERHAPS we can be of service to you.

Among our many products the following are proving useful in numerous industries:

Butyl Phenyl Acetate
Lignin Vanillin
Veratraldehyde
Ethaldehyde
Cinnamic Alcohol
Ionone Ketone
Ionone Methyl
Acetophenone
Linalool Extra
Phenyl Acet Aldehyde Di Methyl Acetal
Di Phenyl Acetal of Phenyl Acet Aldehyde
Hydratropic Aldehyde
Para Methyl Hydratropic Aldehyde

To deodorize Paints for Interior Finishes
DEODORANT BOUQUET 4068

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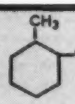
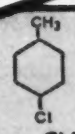
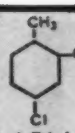
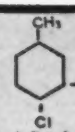
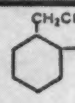
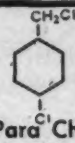
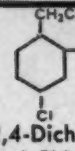
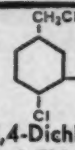
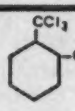
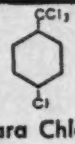
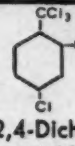
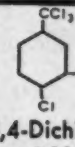
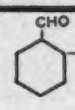
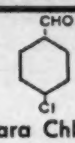
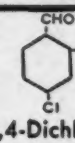
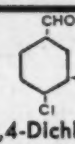
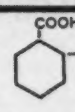
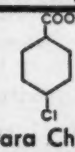
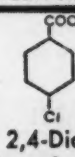
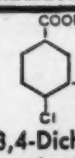
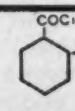
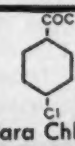
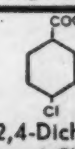
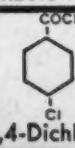
9 S. Clinton Street, Chicago 6 1019 Elliott Street, W., Windsor, Ont.

New Chlorinated Intermediates by HEYDEN

FINE HEYDEN CHEMICALS

Chlorinated TOLUENES	 Ortho Chlor Toluene	 Para Chlor Toluene	 2,4-Dichlor Toluene	 3,4-Dichlor Toluene
Chlorinated BENZYL CHLORIDES	 Ortho Chlor Benzyl Chloride	 Para Chlor Benzyl Chloride	 2,4-Dichlor Benzyl Chloride	 3,4-Dichlor Benzyl Chloride
Chlorinated BENZOTRICHLORIDES	 Ortho Chlor Benzotrichloride	 Para Chlor Benzotrichloride	 2,4-Dichlor Benzotrichloride	 3,4-Dichlor Benzotrichloride
Chlorinated BENZALDEHYDES	 Ortho Chlor Benzaldehyde	 Para Chlor Benzaldehyde	 2,4-Dichlor* Benzaldehyde	 3,4-Dichlor* Benzaldehyde
Chlorinated BENZOIC ACIDS	 Ortho Chlor Benzoic Acid	 Para Chlor Benzoic Acid	 2,4-Dichlor Benzoic Acid	 3,4-Dichlor Benzoic Acid
Chlorinated BENZOYL CHLORIDES	 Ortho Chlor* Benzoyl Chloride	 Para Chlor* Benzoyl Chloride	 2,4-Dichlor* Benzoyl Chloride	 3,4-Dichlor* Benzoyl Chloride

Heyden presents a group of fine chemicals for use as intermediates in the manufacture of dyes and pharmaceuticals, and for the synthesis of other organic chemicals.

The chlorinated compounds shown above, recently developed by the Heyden Chemical Corporation, maintain the uniformly high quality of other Heyden chemicals. Their varied characteristics and properties indicate potentialities for new industrial uses.

All products shown above are available in commercial quantities, except those marked with an asterisk which are available in limited quantities for research use.

FINE HEYDEN CHEMICALS

HEYDEN *Chemical Corporation*

393 SEVENTH AVENUE, NEW YORK 1, N. Y.

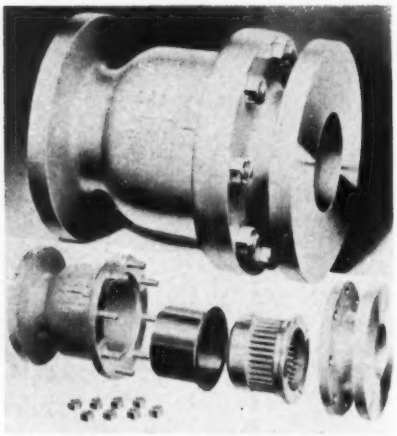
Chicago Sales Office: 180 N. Wacker Drive, Chicago 6, Ill.

Benzaldehyde • Benzoates • Benzoic Acid • Benzyl Chloride • Bromides • Chlorinated Aromatics • Medicinal Creosotes • Formates • Formaldehyde • Formic Acid
Glycerophosphates • Medicinal Guaiacols • Hexamethylenetetramine • Paraformaldehyde • Parahydroxybenzoates • Penicillin • Pentaerythritols • Salicylates

NEW EQUIPMENT

Check Valve QC 780

In the new Grove Chexflo valve operation is effected by a synthetic rubber tube, stretched over a slotted, cup-shaped metal core, which expands to open and contracts to close. Due to the fact that



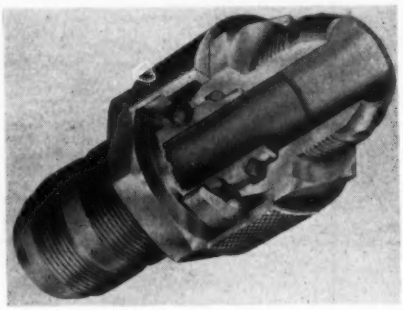
this expansible tube closes instantly on balanced flow, prior to the commencement of back flow, there is never any tendency to establish pressure impulses, shock or water hammer through the flow line. The flexible tube, possesses a uniform and constant spring rate which avoids inertia effects that cause operation beyond flow requirements. Because of its self-compensating and wear resistant factors this unit is particularly suited for handling even the most highly corrosive and erosive air, gases or liquids.

Coupling QC 781

A new Quick Coupling especially designed for use on hoses and lines operating under pressure has been announced by the Roylyn Mechanical Laboratory.

Based on the "inclined plane and wheel principle", the Roylyn coupling employs but three major parts: the cam ring, ball cage, and nipple. By rotating the cam collar steel balls are forced inward into a groove in the nipple forcing the halves together. The gasket retained in the ball cage provides a positive seal against dirt as well as being the separating spring force necessary to the operation of the lock. A slight shoulder on the cam assures a positive lock; application of more pressure tightens it, and only the cam collar can unlock it.

Rigid tests made on the alloy steel model showed an operating temperature range from —65°F. to +300°F. with safe pressure limits of 1680 psi for the 2 inch coupling and 11500 psi for the ¼ inch unit. Couplings are available in



aluminum, brass, or alloy steel with correct gaskets to withstand fuels, oils, and acids. Pipe threads or flared tube connections are optional with caps to fit all sizes of nipples. Standard thread sizes run from ¼ inch to 2 inch with larger sizes available on special order.

Diaphragm Cloth QC 782

Of particular interest to pump and diaphragm manufacturers is the new 80/80 base, Style DL-011 diaphragm cloth, now being produced by Irvington Varnish & Insulator Co. In addition to very good mechanical strength, it is claimed this cloth retains its flexibility and is practically unaffected by relatively wide temperature changes.

Although developed primarily for use in the automotive field, the cloth is being recommended for applications where strength, flexibility, operating temperatures and resistance to certain solvents are important considerations.

Jet Pump QC 783

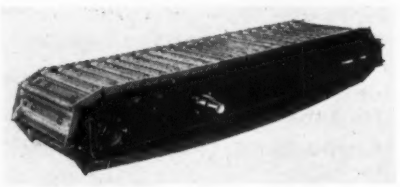
Portable eductors, widely used on shipboard by the Navy and Merchant Marine,

are now available for industrial use. These eductors, manufactured by Schutte & Koerting Co., find ready use in pumping operations as they combine versatility with low initial and maintenance costs. They are of simple, sturdy construction with no moving parts and can be made of a variety of materials, including plastics.

A high velocity pressure jet entrains the secondary liquid to be moved and converts the kinetic energy of the pressure liquid into static head capable of lifting water up to 75 feet. The pressure water used may be obtained from water mains, pumps, head races or similar sources. Since no foundations are required and hose can be easily coupled on, portable eductors, as illustrated, are readily used where other types of pumping equipment would not be suitable owing to inaccessibility, cramped space or time involved in setting up.

Apron Conveyor QC 784

Chain Belt Co. announces the production of a completely self-contained factory assembled heavy-duty apron conveyor unit. The heavy-duty roller sup-



ported apron feeder is furnished in several widths and with centers ranging from a minimum of 4′ 7″ to a maximum of 9′ 1″ varied by 18″ increments.

This type of feeder is widely used under bins and hoppers for heavy lump material such as ore and pit-run gravel

CHEMICAL INDUSTRIES TECHNICAL DATA SERVICE

CHEMICAL INDUSTRIES, 522 Fifth Ave., New York 18, N. Y. (4-6)

Please send me more detailed information on the following new equipment:

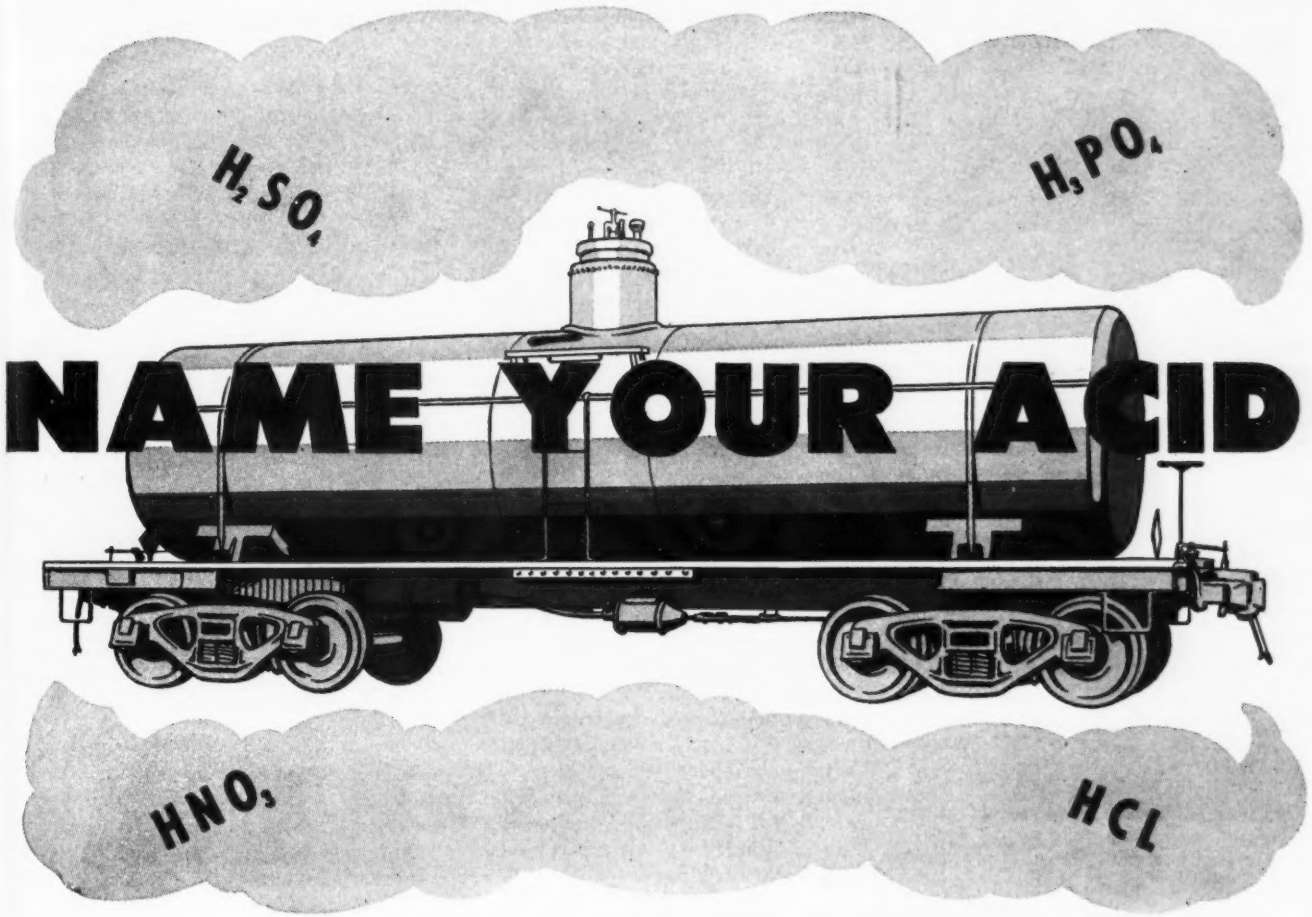
QC 780	QC 788	QC 796	QC 804	QC 812
QC 781	QC 789	QC 797	QC 805	QC 813
QC 782	QC 790	QC 798	QC 806	QC 814
QC 783	QC 791	QC 799	QC 807	QC 815
QC 784	QC 792	QC 800	QC 808	QC 816
QC 785	QC 793	QC 801	QC 809	QC 817
QC 786	QC 794	QC 802	QC 810	QC 818
QC 787	QC 795	QC 803	QC 811	

Name ..... **(Position)** .....

Company .....

Street .....

City & State .....



A Chemico Plant assures efficient production.. recovery.. concentration

For more than 30 years, CHEMICO has specialized in developing processes and building plants for the production, recovery and concentration of sulphuric and other mineral acids.

A large percentage of the world's acid plants have been designed and erected by CHEMICO. Many of the advances in acid plant processes have been originated by CHEMICO. Backed by unequalled resources, CHEMICO technologists are recognized as the leading authorities in this field.

These are some of the reasons why "CHEMICO Plants are Profitable Investments". Your inquiry is invited without charge or obligation.

CHEMICAL CONSTRUCTION CORPORATION
EMPIRE STATE BLDG., 350 FIFTH AVE., NEW YORK 1, N. Y.
European Technical Repr.: Cyanamid Products, Ltd., Berkhamsted, Herts., England
Cables: Chemiconst, New York

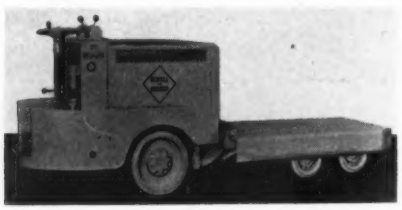
CC-102

CHEMICO PLANTS are PROFITABLE INVESTMENTS

and rock and has exceptionally large capacity. At a normal speed of 10 feet per minute, handling 100# material, capacities of these standard units will run up to 80 tons per hour. Because the heavy steel chain belt rides directly on large diameter traction rollers, the design of the new heavy-duty feeder means longer chain belt life, and reduced power consumption.

Industrial Truck QC 785

Capacities of power industrial trucks in general use have increased substantially after each global war. They were in early development at the outset of World War I; at best they could lift and carry 2 net tons. As that war progressed 3-ton trucks were built; after it was over many more trucks were required, with capacity for transporting loads weighing 5 tons. Now after World War II, trucks of 10



tons capacity are available for general use.

The illustration shows one of a number of these 10-ton units built by the Elwell-Parker Electric Co., for government work, including the Manhattan project. Government and its contractors used all types of industrial trucks, including low and high-lift platforms, forks, cranes and tractors, for innumerable jobs in all parts of the country.

The new trucks are driven by means of storage batteries and electric motors. The body of the truck is low and the operator has complete visibility of platform, load and surroundings. Overall length is 147 inches, width 45 inches. It is steered by means of all six of its wheels. Four of these wheels, under the platform, insure stability of the load. It can turn in aisles 71 inches wide. Speed may be accelerated rapidly to 6 miles an hour, while the truck can come to a "dead" stop within a few feet. Electric drive and controls provide an unusual degree of flexibility.

Gas Turbine QC 786

Successful operation at a gas temperature of 1350° F has been accomplished in a series of successively increasing temperature tests on an Allis-Chalmers experimental gas turbine plant installed in the U. S. Naval Engineering Experiment Station at Annapolis. Designed and built by Allis-Chalmers for eventual operation with hot gas at a temperature of 1500° F, the 3500 HP unit is the first large multi-stage gas turbine for continuous power generation at high efficiency ever operated successfully at such high temperature.

Although this highly significant gas turbine has been developed as a Navy project, its basic elements have characteristics suitable for both land and marine practice, according to Allis-Chalmers engineers. Numerous mechanical, metallurgical and fluid flow problems so prominent in gas turbine development have already been overcome and much has been determined about operating characteristics of the turbine and compressor in completed stages of the comprehensive test program.

The gas turbine plant is arranged with two turbines operating in parallel, one turbine supplying the power required to drive the compressor, the second turbine furnishing the power necessary to satisfy the requirements of the driven machine or dynamometer.

Fresh air enters the compressor at 40,000 cubic feet per minute and is discharged at a pressure of 45 pounds per square inch to the heat exchanger where it picks up heat from the turbine exhaust gases. The heated air then passes through two separate oil-fired combustion chambers where it is further heated to the desired turbine inlet temperatures. The gases then expand in two multi-stage turbines, one of which supplies the power to drive the compressor, the other furnishing external shaft power.

Print Dryer QC 787

A new dryer for photostats, copy prints and blueprints, manufactured in two models for either hand or motor drive, has

been announced by Fedco Products Co. The Fedco drum dryer will dry as many as 120 9x11 or 90 11x14 photostats per hour with the motor-driven model. It incorporates, as an exclusive feature, a continuous single belt made of the best quality duck, pre-shrunk and held automatically to prevent sideslip.

It occupies bench space of only 18 inches square and 15 inches high and will be welcome as a space saver while at the same time doing the work of a larger and more expensive dryer. Its heating system consumes only 300 watts.

The drum is heated by an electrical element mounted on the inside surface, giving even heat distribution and the heat system is controlled so that prints cannot be scorched. A newly developed device enables the electric current to reach the heating element without slip-rings or other potential sources of trouble.

Spot Welding Machine QC 788

The new Besco tweezer spot welding machine is a portable unit weighing approximately 25 pounds. It plugs into 115V. 60 cycle power supply and may be easily adapted to 220V. and has a pair of insulated forged tweezers that plug into the cabinet. It is manufactured by Tweezerweld, Inc.

Its use is for fabricating metal parts measuring .0005" to ⅛" round or thick.

Heretofore the welding of tiny parts has been almost impossible because of

the inherent difficulty in holding them in order to effect the weld. With the use of the tweezers, the electrodes may now be applied directly to the elements to be joined. The tweezers probe for the parts, hold and bend them, and weld.

The tweezers leads are flexible, plastic covered—are 18" long. With the use of the tweezers, oxidation is eliminated. The points require touching up only once a day.

In order to weld some types of heavy gauge metal where more pressure is required, the tweezers may be removed and the machine may be connected to a drill press or hand arbor. Copper or copper alloy rods may be inserted as electrodes with only the bottom electrode insulated. The machine is then operated in the prescribed manner and more varied production is achieved. For some problems the tweezer tips may be shaped or filed to accommodate oddly formed units.

Oxygen Recorder QC 789

A new automatic continuous analyzer for indicating and recording the oxygen content of a gaseous mixture has been developed by Bailey Meter Co. This instrument has been successfully applied to boiler furnaces, kilns, many types of metallurgical furnaces, glass tanks, and chemical and petroleum processes.

The instrument provides a graphic analysis almost instantly, and is said to be responsive to changes of .05% oxygen. Sustained accuracy is said to be within .25%.

In operation a continuous gas sample is mixed with a vaporized liquid fuel and burned on a catalyst-filament which reaches a temperature proportional to the oxygen content. The filament resistance is a function of temperature and a simple

YOUR *Buying Guide*

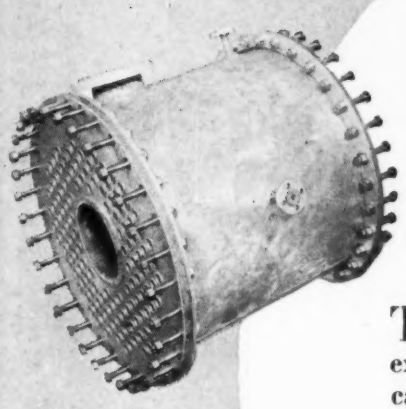
PATTERSON-KELLEY *Heat Exchangers* AND *Process Equipment*

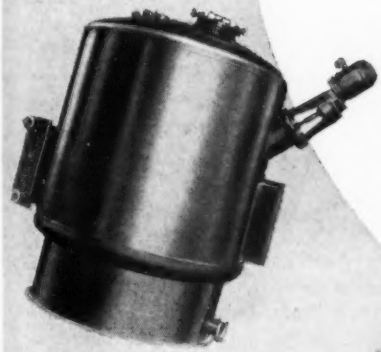
DO YOU NEED

Autoclaves, Coolers, Heat Exchangers, Condensers, Heaters, Kettles, Mixers, Stills

MADE OF

Aluminum, Carbon Steel, Copper-Silicon Bronze, Copper, Nickel-Clad, Stainless-Clad, Stainless Steel

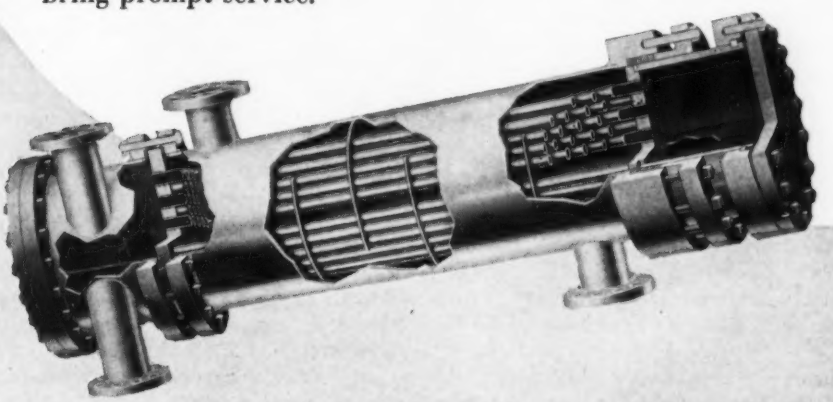




These sixteen listings cover a wide variety of processing and heat-exchanger units and will give you an idea of what Patterson-Kelley can make for you.

If you would like us to design the units you require, our engineers will be glad to do so. They are familiar with most processes and requirements in the way of heat transfer equipment. They know thoroughly the principles of heat transfer. Or, if you prefer to design your own equipment, we shall be glad to quote on the manufacture.

A phone call or letter to our nearest office or representative will bring prompt service.



THE PATTERSON-KELLEY Company, Inc.

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resistance bridge is connected to a null balance electronic recorder which may be calibrated in excess air, per cent oxygen, or other desired terms.

A high speed sampling system for handling dirty, high temperature gases is furnished with the instrument when required.

The high speed of the instrument makes is ideally suited for traverse studies, and other types of test work, as well as continuous day to day operation.

Meter Valve and Slide QC 790

Characteristics of the new liquid meter valve of Morganite Brush Co. are as follows: Immune to acid; alkali and most solvents; coefficients of expansion down to 0.000,001 and no warping or sticking in gum or hardening cold. Excellent performance can be attained at 850° F. Other physical properties: Shear strength to 10,500 psi; compressive strength to 52,000 psi; tensile strength to 4000 psi.

Morganite self-lubricating valves and slides frequently seal across four or more pressure differential bands without trouble. They function against zinc base alloy, aluminum, cast iron, or bronze. Depending on speed and environment, any metal or alloy may be considered as a satisfactory seat or mating face against Morganite.

High Temperature Furnace QC 791

A new high temperature furnace, to be known as the Huppert "Hi-Temp" Furnace, has been especially designed by K. H. Huppert Co. for continuous operating temperatures up to 2200° F., intermittent to 2250° F.

It is available in floor and table models. Both models are furnished complete with automatic temperature control and feature multi-insulation; high temperature alloy elements; "on-off" switch; two pilot lights (one for indicating that furnace is operating and the other serving as a safety light to indicate any failure occuring in heating elements); all-steel, heavy-duty construction; counterbalanced door; black wrinkle finish. Both models are delivered ready for operation by merely connecting the line to the outlet box provided with the furnace.

Operates on 110V., AC only—power consumption 2KW. The same inside dimensions apply to both floor and table model, namely: I.D. 5½" wide x 3⅝" high x 6" deep (3½" throat additional). O.D. of table model 18" wide x 32" high x 20½" deep. O.D. of floor model 18" wide x 63" high x 22" deep. Bottom of inside dimension to floor—41". Floor model is equipped with two convenient, steel shelves for temporary storage.

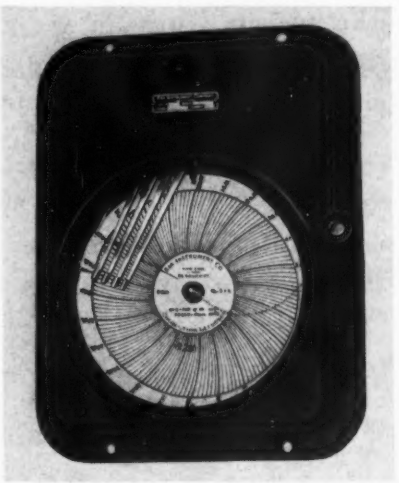
Pipe Joint Compound QC 792

Lake Chemical Co. announces Pipetite-Stik, pipe joint compound, in handy, easy-to-use stick form. All that is necessary is to rub 3 or 4 strokes of stick across pipe threads. It spreads and fills threads when turned. Encased in a convenient cardboard holder, the stick may be carried around in a pocket or tool kit, always ready for instant use.

Operational Recorder QC 793

The Ess Instrument Co. announces the availability of an Operational Recorder to provide a continuous record of "Time On" and "Time Off" of multiple operations.

This instrument can be provided with a single acting pen, two position double acting pen or a three position pen. As many as six single or double acting pens can be combined on a single chart. It can be supplied in 115 to 230 volts AC or with special voltages on application. AC clock mechanisms are available from 15 minute periods to 8 days.

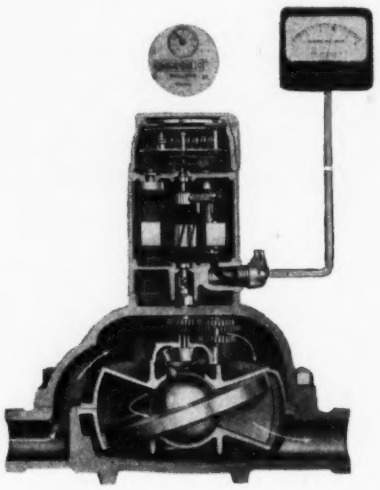


When operation is normal a circle is traced. If the process goes too far in one direction, the pen moves outward and remains there till "normal" is resumed when the pen returns to the center point. If the process goes too far in the other direction the pen moves to the other side of "normal" and remains there as long as the conditions persist.

As many as six of these three position "Normality" pens can be placed on one chart to give a complete picture of the "Normality" of six processes by a glance at the chart.

Indicating Flow Meter QC 794

The Hays Corp. announces the Hays Veriflow Meter for measuring, indicating, and totalizing liquid flow rates. The principal feature of the new meter is its ability to indicate the rate of flow at a point remote from where the meter is installed. This is in addition to the rate of flow indication and integrator, integral with the meter itself. To secure remote indication the generator is mounted on top of the flow meter, the same shaft operating both the generator and the totalizing register. No external source of electricity is required because the indicating meter measures the output of the generator and is calibrated to indicate the corresponding rate of liquid flow.



Immersion Heater QC 795

The American Instrument Co. announces a new automatic electric safety immersion heater for liquids.. The built-in safety control will limit the temperature rise of the heater and thus protect it against overheating and burning out should the liquid level fall and expose the heating element to air. A pilot light indicates when the heater is operating.

The heater can be quickly screwed into the walls of a tank, drum, etc., through a 1-in. pipe fitting or reducer, and only two wires need be connected from the current supply to the heater. Two or more of these automatic heaters may be installed on one application and adjusted for step temperature control, or, where it is desirable to install more than one heater in the same vessel, the Aminco Safety Heater can be used to regulate one or more non-automatic heaters through a relay.

By merely turning an indicating screw, this heater can be set, as desired, from

Total Flooding Kills Fires in 20 Seconds

When fire breaks out in a room housing a flammable liquid or electrical equipment hazard, a Kidde total flooding system extinguishes the flames in 20 seconds—or even less.

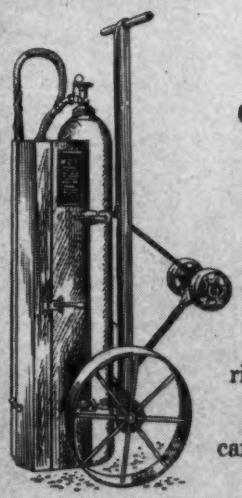
As the name indicates, a total flooding system, by discharging carbon dioxide into the protected area, dilutes the oxygen content within the entire room to a point where fire can no longer exist. Such a system can be engineered for either automatic or manual discharge of the carbon dioxide.

Carbon dioxide capacities are calculated on the basis of the size of space to be protected, with adequate allowance for leakage through openings. For full details on total flooding systems write Walter Kidde & Company, Inc.

Short Story on TRIGGER CONTROL

For a quick-reading summary of the outstanding advantages of Trigger-grip Control (now standard on all Kidde Hand Portable Extinguishers) write for free copy of 4-page bulletin AD531. Walter Kidde & Company, Inc., 427 Main Street, Belleville 9, N. J.

Kidde

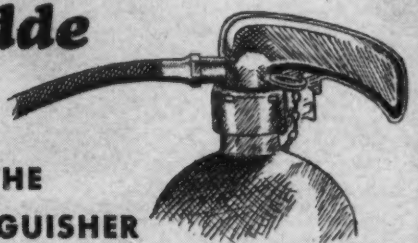


GETS TO FIRES *FAST*

Kidde Wheeled Units are easy to maneuver—pack a terrific fire-fighting punch! 50, 75 and 100-pound carbon dioxide capacities.

Mail and Phone Orders Filled

Kidde

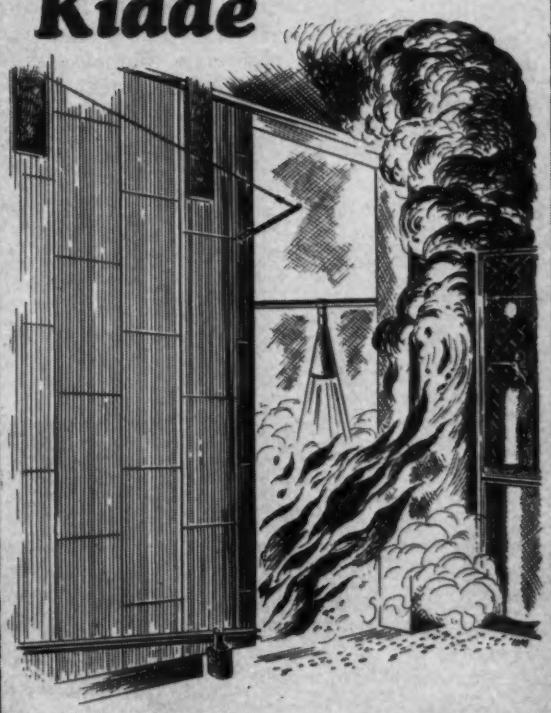


THE EXTINGUISHER A NOVICE CAN USE

No special training needed to operate the Model 15 Portable. Just aim at the fire and pull the trigger! Same design available in 10 and 20-pound capacities.

Mail and Phone Orders Filled

Kidde



Slam the door on Flames!

Process rooms and other hazardous areas can be automatically isolated, if desired, as part of the operation of Kidde built-in systems. Release of the carbon dioxide actuates trips which allow fire doors and windows to close. Time delay mechanisms allow workers plenty of time to leave before doors close.

The word "Kidde" and the Kidde seal are trade-marks of Walter Kidde & Company, Inc.

Walter Kidde & Company, Inc. • 427 Main Street, Belleville 9, New Jersey

Disorders Break Out

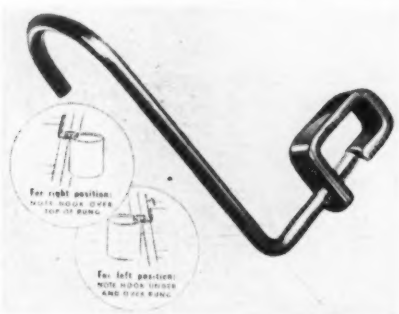
Bill May Force

room temperature to 350° F. Thenceforth, the heater will continue to maintain the temperature of liquids within ± 5° F.

These heaters are available with copper sheaths for heating water, or with steel sheaths for heating light oils, in wattage ratings of 250, 500, 750, and 1000.

Paint Can Hook QC 796

The new paint hook of the T. G. Persson Co. places the can at the best position



for ease in painting . . . with safe, secure positioning at all times.

A simple adjustment permits the can to be hung on right or left side of ladder. To go to the right the hook is slipped over the top of the rung. For the left the hook goes under and over the rung; a quarter turn on the clamp places the paint can in upright position.

Two cans may be hung on opposite sides of any ladder—without interference to the painter.

Electronic Counter QC 797

A new electronic counter has been announced by Potter Instrument Co.

This unit, a Dual Predetermined Electronic Counter, employs four of the standard Potter 4-tube counter-decade circuits. These decades are arranged to give two independent predetermining channels in which any number from 0 to 10,000 may be initially set up by simply manipulating rotary switches on the front panel.

During the operation of the equipment each channel is alternately preset to the desired predetermined number. This function is accomplished automatically by self-contained circuits, and occurs in less than one (1) millisecond—a feature which cannot be obtained with current types.

The input is arranged for operation with either make-contacts or with sharp negative pulses, as specified. Input frequencies may be in excess of 1000 cycles per second.

The output consists of an ultra high speed relay with single pole double throw contacts. This relay is energized at the end of one predetermined count cycle and remains energized throughout the other predetermined count cycle. Power for operation is obtained from a 110 volt 60 cycle circuit. Units are available for any specified total count with either the single or dual predetermining channels.

Magnetic Separator QC 798

The Prater Certified Permanent Magnet, for the removal of tramp iron from material, is announced by the Prater Pulverizer Co. The Prater Magnet can be mounted on feed tables or spouts at any point in the flow. It is of the two gap type with double Alnico magnets and triple plates, mounted in a one piece bronze frame.

Conveyor Trolley QC 799

Announcement is made by Link-Belt Co., that they have developed, patented and are now manufacturing a new free-rolling conveyor trolley that is unique for its simplicity.

Contrary to the design of conventional I-beam trolleys, the new Link-Belt trolley has no wheel shafts, or spindles, and

does not require separate retainers for its full complement of hardened, accurately balanced alloy steel balls.

The photo illustrating part of trolley cut away shows that the two basic elements (wheel and one-piece bracket) which form the deep inner and outer races of the bearing. The inner bearing race, being a part of the wheel forging, revolves within the outer race formed by head of trolley bracket. This differs from conventional trolley construction, in which the inner bearing race is mounted on a fixed shaft and the outer race revolves around it as part of the trolley wheel.

The revolving inner race distributes wear completely around the ball-path. All fixed points of pressure are on the outer race, where the larger diameter provides a greater area of distribution and, consequently, greater resistance to wear.

Protective felt seals and adequate lubrication reservoirs are important features of the design. Wheels and brackets are drop-forged steel, with ball races accurately machined and hardened. The wheels are "coined" for roundness and freedom of rolling action.

Another new feature is the inclusion of both the outer bearing race and the carrying attachment in a single bracket. The lower ends of the two brackets are connected by two bolts, and have horizontal flanges between which the trolley is joined with conveyor chain link.

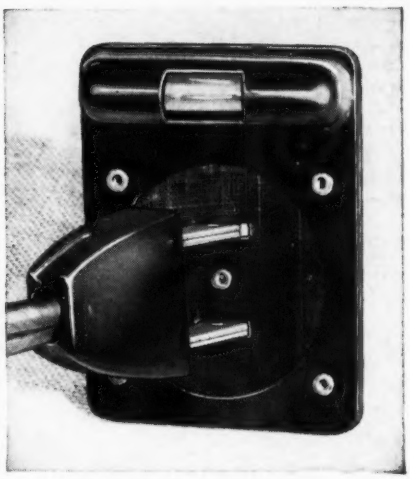
The one-piece brackets transmit the weight of suspended load directly from supporting clevis (or other attachment) to the ball bearings, as they do the load resulting from chain pull on vertical curves, without the use of intermediate elements.

The distance from centerline of conveyor chain to attachment pin has been held to a minimum, thus reducing the resultant action when traveling in an inclined position.

This short drop is also an advantage when load-bars are used on a four-wheel trolley assembly, inasmuch as it serves to distribute the weight of the load more equally between the two suspension points.

Plug-In Pilot Light QC 800

On or off is reported by the Handi-Glow on any electric outlet, socket or power cord. Wafer-thin, this handy neon-light indicator takes the usual plug



prongs slipping through its slots and into the standard electric outlet or the female plug. Protected by a metal housing, the neon bulb is over the head of the plug, in full sight at all times. It operates for 1-2c per year for power.

This device, offered by Industrial Devices, Inc., is for use with any standard 110 volt AC or DC outlet.

Stack Analysis Instrument QC 801

The Davis Emergency Equipment Co., Inc., announce a new portable instrument, known as the Stack-o-meter (exclusive license—Wm. O. Heblek Co. patents) for indicating carbon dioxide, stack temperature and draft readings.

All readings are taken on one meter

FOR RENT

37,000 Specialized Tank Cars—207 Types—For Swift, Sure, Economical Transportation of Liquids in Bulk

GATX tank cars—207 types from 4,000 to 12,500 gallon capacities—haul an almost infinite variety of liquids: from propane to port wine to pine tar.

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Take your tank car problems to our nearest office

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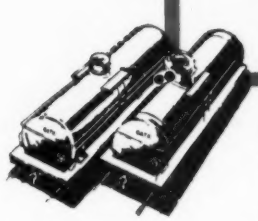

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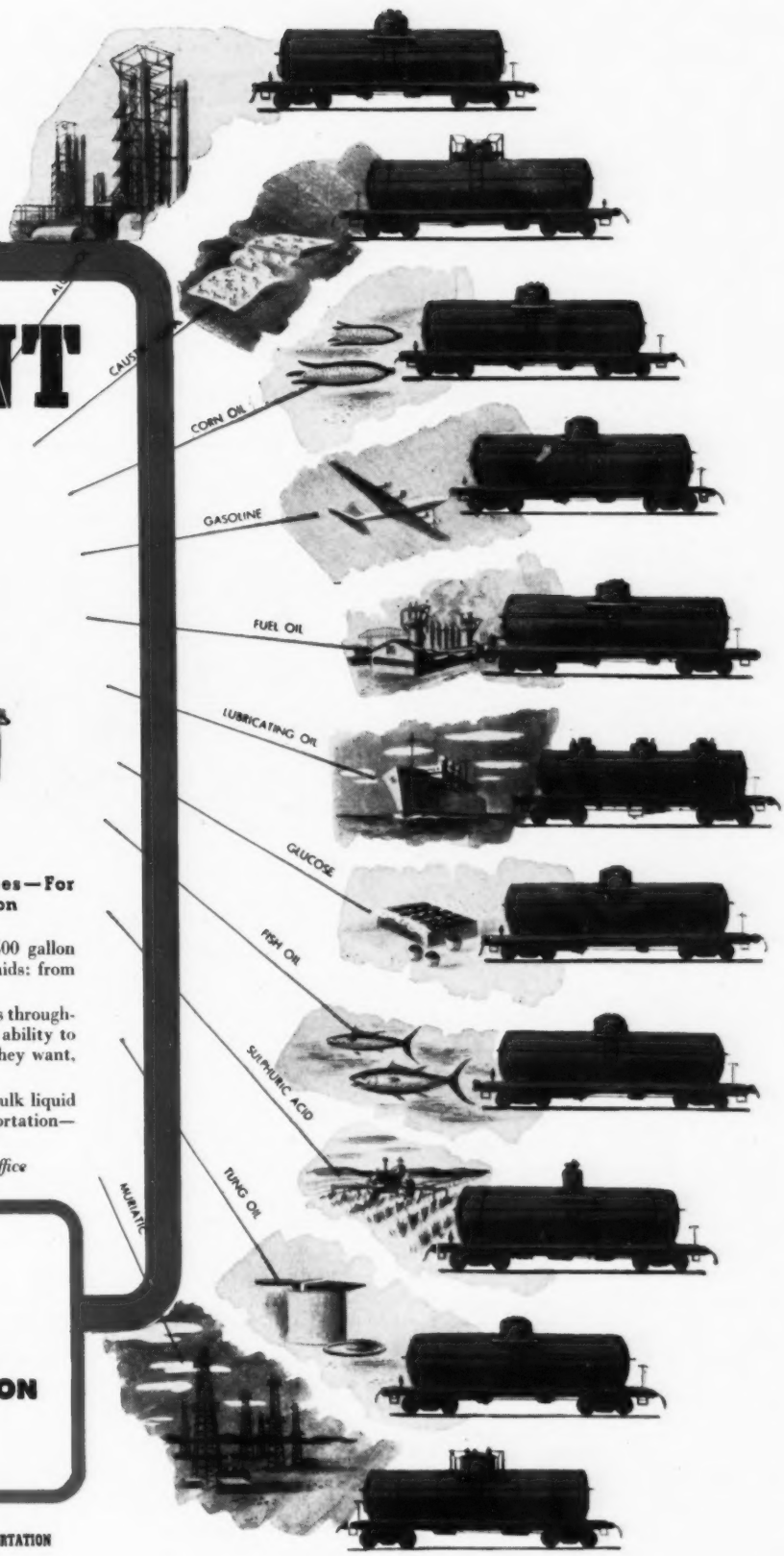


CO_2 percentage readings are obtained from gas samples collected through a hand aspirator bulb. Stack temperatures are read on the same dial, obtained electrically from a thermocouple mounted in the gas sampling tube. Draft measurement is obtained through a separate tube, but read on the same meter. The meter dial reads 0 to 20% CO_2 in black figures, temperature on a red scale 0 to 1000° F and draft in tenths of inches of water on a green scale.

A feature of the Stock-o-meter is a safety switch which shuts off battery current on closing the cover of the instrument box.

Complete portability is obtained by having sampling hose, hand aspirator, thermocouple sampling and draft sampling tubes all carried in the one case, 12″ x 13″ x 5″. The weight of the complete instrument is 11 lbs. The Stack-o-meter is based on the gas analysis by means of thermal conductivity.

Automatic Control Actuator QC 802

The Beck mechanism is a highly developed automatic control actuator which

operates valves, rheostats, auto-transformers and similar devices based on three control actions.

C-1 is proportional to and opposes any change of the controlled condition within the throttling range. If this were the only control action, a return of the condition to the control point would place the regulating device in the position from which it started and, on a sustained load change, continuous hunting would result, or if the throttling range were corrected to avoid hunting the process would settle down at some value off the control point.

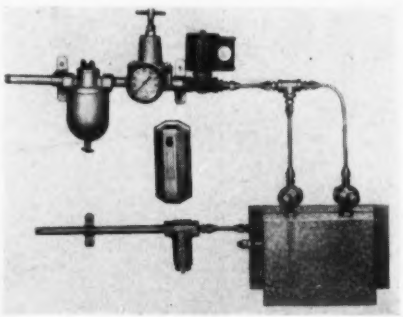
C-2 and C-3 are the automatic reset or droop corrections which eliminate this effect. The C-2 is the major part of the correction. It is proportional to the C-1 action, and is introduced to the system as fast but no faster than it can be absorbed. The C-3 action consists of an impulse that is periodically introduced when the system is off the control point, to move the regulating device in the proper direction to restore the system to the control point.

This is a timed action and is proportional to the magnitude of the deviation. C-3 prevents the system from staying off the control point due to some unusual combination of demand change and control action.

Each Beck mechanism is driven by a slow-speed, high torque, non-coasting Beck control motor. A non-mechanical magnetic brake assures accurate reproduction of minimum turn down and non-hunting control action without sacrificing sensitivity of the control system. The heavy motor shaft turns in grease-sealed ball bearings. The armature can be stalled without damage to the mechanism and the stalled motor will not overheat As proven by years of service under severe conditions, the unique features of this mechanism assure continuous operation at maximum sensitivity without need for adjustment.

Humidifying Unit QC 803

The new industrial humidifying unit produced by Spraying Systems Co. intro-



duces a departure from conventional methods in that the entire, compact unit is delivered ready for installation.

It is made with two or four nozzle units with humidistat control and the nozzles can be set at various angles to increase efficiency of moisture distribution. Siphon type humidifying nozzles are used which utilize compressed air, mixed externally, producing an exceedingly fine, round (full cone) spray. A complete two-nozzle unit is shown in the accompanying illustration.

3-Core Solder QC 804

Tri-Core, the solder with three independently filled cores of pure rosin flux, is a new development of Alpha Metals, Inc. It offers faster soldering and elimination of dry joints, in addition to substantial savings in tin.

A continuous supply of high grade non-corrosive rosin flux is always present in Tri-Core Solder, as the three cores are completely independent of each other. With these three cores, occurrence of "dry" sections in more than one core at a given point is mathematically unlikely, making Tri-Core more efficient and less wasteful than the usual single core solder.

The arrangements of the three cores places them closer to the surface. Since the walls are thinner than those of single core solder, not only does the solder melt more quickly, but the heat penetrates to the flux more rapidly, allowing it to flow freely and reach the work ahead of the molten solder.

Check Valve QC 805

A discharge check valve has been designed by J. A Zurn Manufacturing Co.

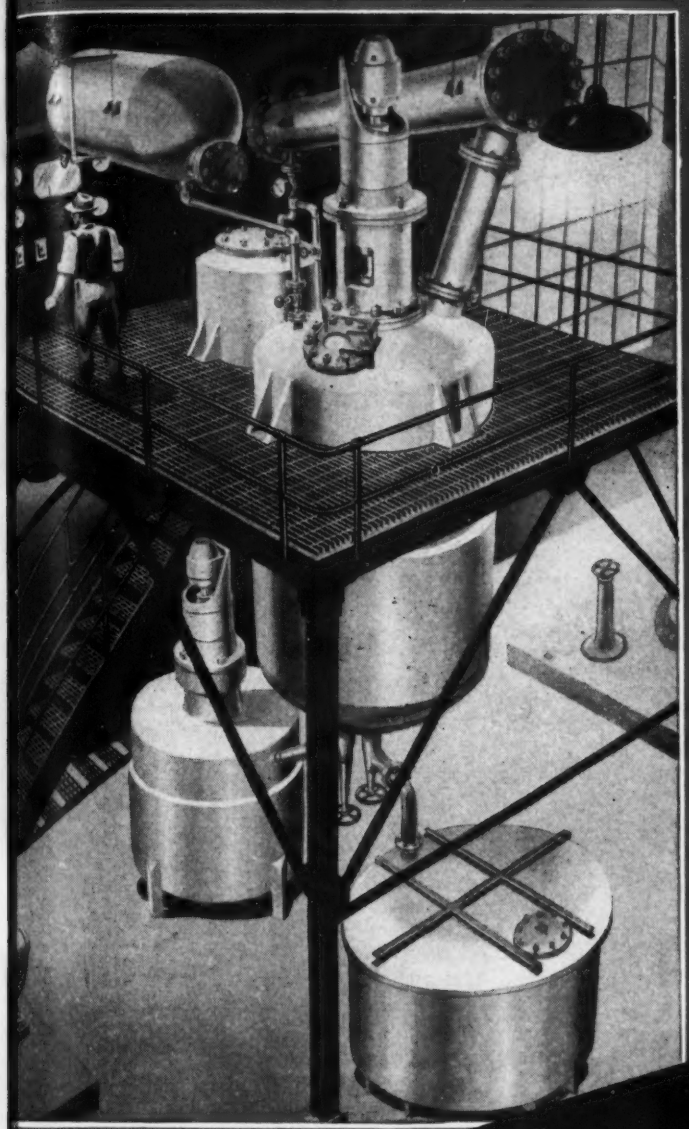
to give positive protection against the backsurge of discharge lines carrying steam, sludge, waste water and other waste liquids in gravity flow installations.

In order to assure non-fouling of the valve, these units have a swing check flap suspended from a full floating pin fulcrum to insure positive full surface contact between ground face or flap and flap seat. The knob in the center of the top surface of the swing check flap contacts the valve body roof at only one point when the swing check flap is wide open. This prevents the swing check flap from touching the sides of the valve body and assures free operation of the swing check flap. Location of swing check flap in relation to interior of valve body provides ample protection against sediment blocking of the valve. The swing check flap suspended from cover can easily be removed, and replaced.

Discharge check valves may be operated with or without a manual control or with an extension shaft or flexible cable from an access box. The units are hydrostatically tested. Flanges are 150 lb. flat faced and blank or drilled as specified. They are available with 180°; 105° or 90° bodies made of cast bronze, steel, semi-steel, cast iron and alloyed metals for corrosion resistance.

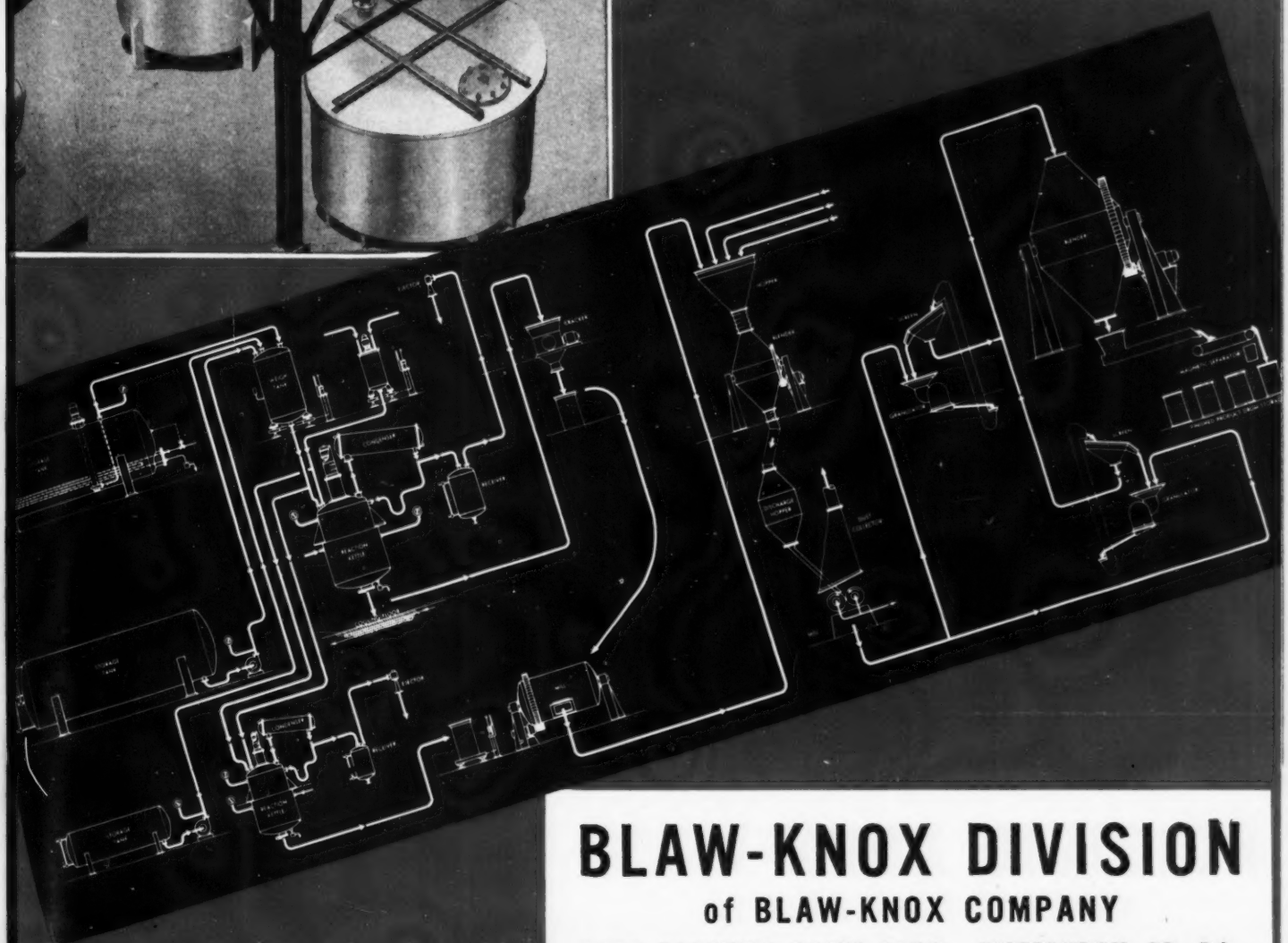
Stainless Steel Filter Medium QC 806

A new stainless steel filter medium has been developed by the Micro Metallic Co. This new product, available in a wide range of pore sizes, is a strong and ductile porous structure. These filters are made from stainless steel powder, the particles of which are welded together at the points of contact into a strong porous body, which in the form of thin sheets can be bent about a small radius. Conventional resistance welding tech-



BLAW-KNOX *builds* PRODUCTION UNITS...

equipment and complete plants — for the production of phenolic and urea resins as well as for other synthetic resins.



BLAW-KNOX DIVISION

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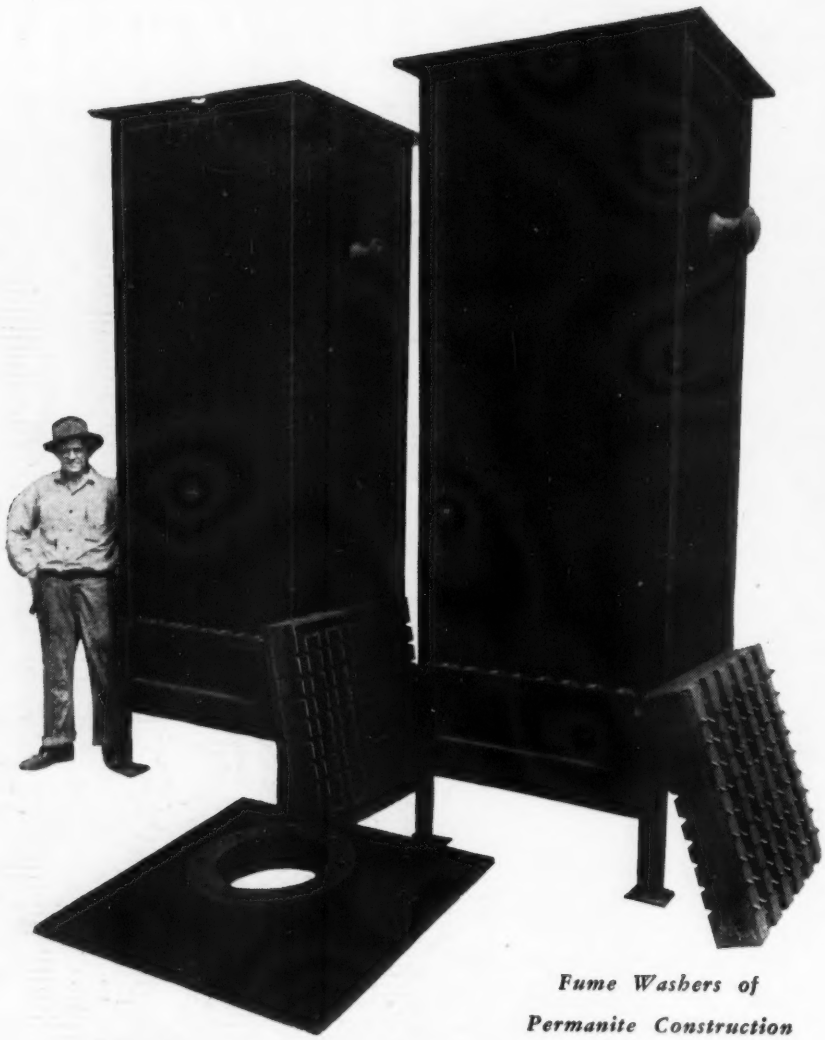
Visit the BLAW-KNOX EXHIBIT (Booth No. 13) at the CHEMICAL SHOW, Grand Central Palace, New York, February 25 to March 2, 1946.



Fume Washers of
Permanite Construction

PERMANITE

offers many advantages

These fume washers are built of tough acid and alkali-proof Permanite, reinforced with woven glass fabric. Angle iron frames and legs complete the structure.

These Permanite units are comparatively light in weight. Thus they are easily moved and require no heavy, expensive foundation. They will handle all acid fumes including hydrofluoric acid. Also any concentration of alkali wash solutions.

Knight engineers designed these Permanite units and guarantee their satisfactory functional operation under service conditions for which they are intended.

At no obligation to you, Knight engineers will be glad to recommend a design to handle your fume problem. When writing please give us complete data.

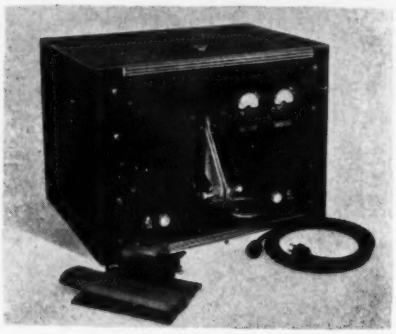
MAURICE A. KNIGHT
204 Kelly Ave., Akron 9, Ohio

niques can be used to fabricate compli cated apparatus. The average pore open ings regularly supplied range from 4 t 165 microns (.00015 to .0065 inches). Ap plications include: filters, aeration units breathers, flame arrestors, pressure snub bers, selective separations of fluids, etc

Induction Heater QC 80

The Marion Electrical Instrument Co has announced a portable bench-type in duction heater.

Developed to meet the need for clean soldering of small parts, and for solder ing of metal to metallized glass and ce ramics, this new induction heater opens



up to a large field of production the pos sibility of radically reducing the unit costs for soldering operations.

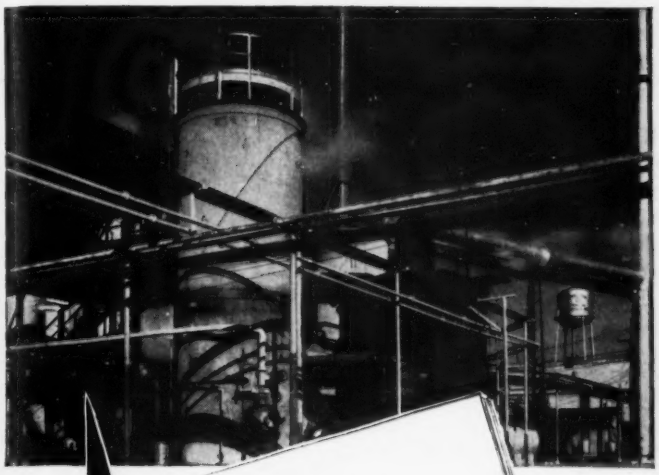
The Marion induction heater has been used to solder small radio and radar as semblies as well as components. It is applicable to uses in other fields wherever small metal parts or assemblies require soldering. It is cheaper to use than a solder pot because it consumes only 775 watts at full load, and only 100 watts on standby. Power is drawn only when sol dering is taking place.

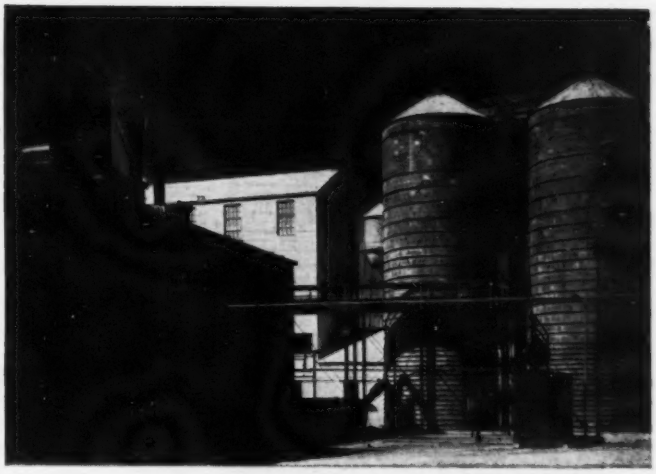
Originally developed at the Marion Electrical Instrument Co. this unit has undergone many refinements, with the cooperation of the Polytechnic Research and Development Co., Inc. The circuit design is such that the operation of the heater offers less hazard than a soldering iron. There is no danger of sparking or radio frequency burns from the output terminals or work coil. The coupling link, operating at low impedance, is pro vided with a grounded center tap. The frequency, 450 kilocycles, produces no harmful radiations, and the unit is com pletely shielded for safety and to meet FCC requirements with reference to radio interference.

The circuit has been arranged to pro vide adequate grounding for all elements which might be damaged by arc-over. The rectifier choke and plate current mil liammeter are both in the grounded cen ter tap leg of the power transformer, placing them at ground potential.

Two switches constitute the controls. No tuning control is needed or used. One of the switches controls the power to the tube filaments, and constitutes a standby switch. In this condition, the heater con-

GETTING ACQUAINTED WITH TEXAS GULF COAST INDUSTRY





PHOTOGRAPHS BY BOB BAILEY

HOUSTON— Where Texas Raw Materials Become Industry's Chemicals

The basic heavy chemicals are being manufactured on the Texas Gulf Coast in immense quantities . . . sulphuric acid, hydrochloric acid, chlorine, and caustic soda. In addition, a variety of specialized chemicals are being made for special processes, and to utilize the residues of established industries.

The chemical resources of the Texas Gulf Coast support the manufacture of synthetic rubbers, plastics, fabrics, solvents, explosives, resins, and numerous other products.

The Houston plants pictured here play important parts in the manufacture of Gulf Coast chemicals. Consolidated Chemical Industries, Inc., for instance, is one of the few plants in the nation processing bones for the manufacture of Bone Char, the sugar industry's best decolorizing agent. Bone oils, bone meal, sulphuric acid, hydrochloric acid, and salt cake are other Consolidated products. Nyotex Chemicals, Inc., is well known as a manufacturer of raw quick lime, chemical grade hydrated lime, anhydrous aluminum chloride, and anhydrous hydrofluoric acid.

Natural gas, so abundant in the Texas Coast Country and so readily available to industries, is not only the fuel for industry's boilers; it also is a first-rank source of raw material in the manufacturing processes of the chemical industry.

No matter what your manufacturing process, opportunity beckons on the Texas Gulf Coast. For detailed facts about the region's raw materials, individualized to your own products and processes, write for a comprehensive, carefully engineered survey. There is no cost or obligation, and your inquiry will be kept in strict confidence. Address Research Department, Houston Pipe Line Company, P. O. Box 2412, Houston 1, Texas.

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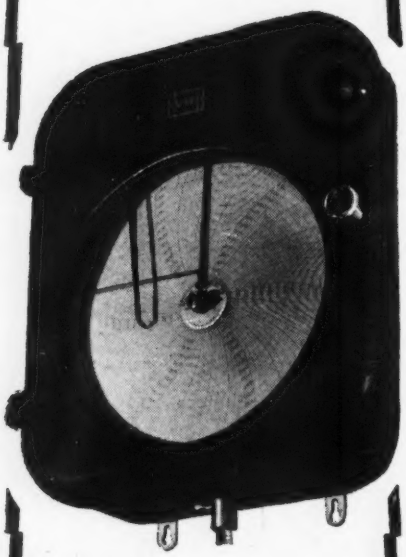

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sumes only 100 watts. The other switch, also mounted on the panel, is the operating switch and controls the high voltages to the tubes. Provision has been made to operate this switch circuit by foot treadle when desired.

The Marion bench-type induction heater is furnished in a standard relay rack cabinet, and measures 15¾" x 21½" x 15", and weighs 150 pounds. 115-volt, 60 cycle power supply is required, but since the input is only 775 watts, special wiring is not required. Line filters are incorporated so there is no danger of RF kickback in the line.

Apron QC 808

The new Gardwell Oil-Chem apron has proven satisfactory for use in operations where protection to clothing against oils, stains, acids and chemicals is essential. These aprons are made of a pliable, transparent plastic material, clear in color and .006 to .008 inch thick for light weight and comfort to the wearer.

Gardwell Oil-Chem aprons are equipped with grommets and tie strings at top of bib and at the waist line to hold the apron comfortably in place. It is available in bib or waist style in a wide range of sizes and is manufactured by Safety Clothing and Equipment Co.

Fire Extinguisher QC 809

A new model wheeled portable fire extinguishing unit with a capacity of 750 pounds of liquid carbon dioxide is now

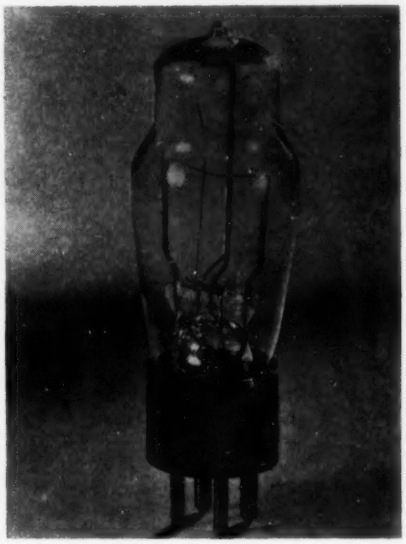
available. The unit is the Cardox Transitank, manufactured and marketed by Cardox Corp. An application rate of 300 pounds of carbon dioxide per minute from a single nozzle is obtained.

In the Transitank liquid carbon dioxide is stored in a refrigerated and insulated pressure vessel at a constant temperature of approximately 0° F. and 300 pounds per square inch. At this temperature, the liquid carbon dioxide yields 47% CO_2 "snow" (finely divided particles of dry ice) when released.

The Transitank is manufactured in three types: an all-purpose, indoor-outdoor unit equipped with pneumatic tires, which may be either hand-propelled or attached by its trailer hitch to any industrial power truck; a steel caster unit designed for extreme maneuverability and close clearances indoors and a motorized unit for industries and operations requiring a unit capable of traveling comparatively great distances quickly. All are equipped with the "Snow-Separation" nozzle, 50 feet of hose and squeeze valve that gives instant control of the carbon dioxide discharge. Refilling of the Transitank is by means of Cardox transport trucks, with the liquid carbon dioxide pumped into the unit directly from the truck.

Vacuum Gage QC 810

A tube with a hot junction of a thermocouple element centered on a filament heater, designed to measure gas pressure changes through variations in thermal conductivity of the gas, has been an-



nounced by Sylvania Electric Products Inc. Used with a microammeter it will record pressures of 10^{-1} to 10^{-5} millimeters with plus or minus 5% accuracy.

Operated in a simple three volt battery and resistance circuit, it may be sealed directly into evacuating apparatus by means of tabulation provided on top of the bulb. Direct measurement may be made with a 0-250 microammeter which may be calibrated for each gas measured. Maximum accuracy is assured by shielding the equipment from sources of radiant heat and air currents.

The tube, 4 7/16" long over pins and 1 9/16" maximum bulb diameter, is supplied with small 4-pin base and may be operated in any position. Maximum value electrical ratings are: filament resistance, 3.0 ohms; thermocouple resistance, 5.0 ohms; filament current, 125 milliamperes; and thermocouple current, 250 microamperes.

Power Factor Regulator QC 811

The Haug System power factor regulator is announced by the Modern Control Equipment Co. The makers state that

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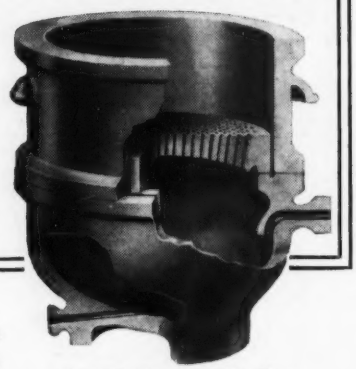


Fig. 706 Two-piece Suction Filter with Loose Plate.

"Filterstone" Porous Filter Plates are strong, sturdy, completely corrosion-resistant. Used in conjunction with "U. S." chemical stoneware Suction Filters, they assure an absolutely clear filtration of essential oils, drugs, extracts, lotions, medicines, dyes, perfumes, etc.... *and up to 400% faster filtering!* "Filterstone" Porous Plates do not clog easily — can be washed out quickly.

"U. S." chemical stoneware Suction Filters are made from Ceratherm-500 heat-shock resistant stoneware, proved more than 27% stronger than ordinary stoneware bodies. *"U. S." Suction Filters will withstand a complete vacuum.*

"U. S." Suction Filters are normally stocked in five styles and in capacities ranging from five gallons to one hundred gallons, with either integral or loose support plates. "Filterstone" Porous Filter Plates are available in sizes to fit "U. S." Suction Filters, and in three different porosities: fine, medium and coarse.

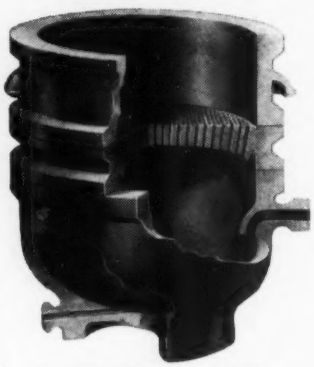
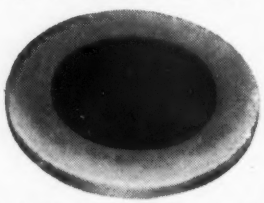


Fig. 709 Sectional Unit Filter.



Resin Edge-Sealed "Filterstone."

Fig. 92

RECTANGULAR TANKS

Fig. 92 Rectangular Tanks are available (usually from stock) in capacities ranging from 4 gallons to 150 gallons. (On special order up to 320 gallons.) Fig. 92 Rectangular Tanks are one-piece construction, with a smooth, easily cleaned surface, inside and out.

Available in either standard chemical stoneware or in our "Ceratherm-500" heat-shock resistant body. Completely acid-and-corrosion-proof all the way through. Write for Bulletin 405-5 showing our line of round and rectangular pots, jars and tanks.

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it will raise the power factor by taking the magnetizing current off the line at a negligible cost and, by increasing the power factor, it will greatly reduce the monthly power bill. Also, it will increase low voltages to the desired value where due to poor power factor. The reactors and transformers are of dry type construction. There are no moving parts, small in size and can be installed in almost any desired location. No fireproof enclosures are necessary. No discharge coils or other safety devices are required. It is made under A. I. E. E. specifications and N. E. M. A. standards.

Fire Extinguisher QC 812

Pressurelube, Inc. announces the new All-Out dry chemical fire extinguisher.

The dry chemical is ejected, under pressure, in a flat stream, that separates the flame from the burning material, instantly forming a fire smothering cloud over a flaming area up to a distance of 18 feet. All-Out also creates an insulating barrier between the operator and the flame, providing protection from radiant heat. On hot metal surfaces the dry chemical forms an insulating film, helping to guard against dangerous re-flash.

The new extinguisher forms no toxic gases, is a non-conductor of electricity, non-abrasive and harmless to finished surfaces. A squeeze grip nozzle is provided for positive control. The chemical will not deteriorate or cake. Twenty-six inches of ½ inch ID pressure hose permits rapid maneuverability of the dry chemical stream.

All-Out dry chemical extinguisher meets the requirements of the Associated Factory Mutual Laboratories and Underwriters Laboratories.

Flexible Gear Turret QC 813

Brooks Equipment Corp. announces a new flexible means of connecting shafts. The new flexible gear turret is designed for connecting shafts which form any angle between 0° (straight line) and 95°

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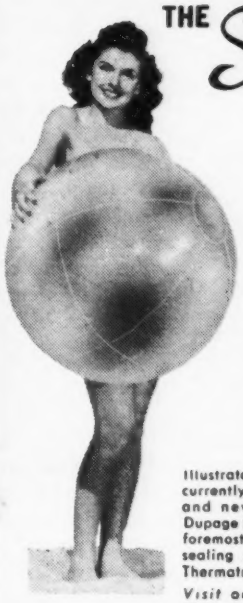

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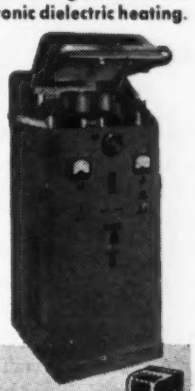

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on either side of zero angle. An arrangement of the bevel gears attached to shafts which are supported in hinged housings permits the shafts to oscillate and rotate simultaneously. Horse power capacities are based on the Lewis Formula and are consistent with standard power transmission practice used for shafts ranging in size from ¾" to 1½" diameter. Two types of brackets are offered.

Safety Siphon QC 814

A new and improved safety siphon made of an inert plastic is announced by The Alden Speare's Sons Co. It is used to draw acid from carboys of from 5 to 13 gallons, or from the side bung of 50 to 55 gallon drums.

The safety siphon is easily and quickly primed by a built-in pump. Thereafter no further action is required. The entire contents of the carboy may then be discharged by the siphon by manipulation of the flow control valve which may be adjusted from a tiny trickle to a fast steady flow.

Fire Control Nozzle QC 815

A new fire control nozzle for fixed installations, constructed in such a manner that it produces a fog, is announced by the Blaw-Knox Sprinkler Division.

The nozzle, which has been named the Aquatomic fog nozzle, is particularly adapted to the protection of tanks containing flammable liquids, either in tank farms or housed in buildings. The fire-stifling fog is produced by forcing water through three clear spiral passages and a clear central passage in the head of the nozzle. There are no internal obstructions to impede the free flow of water.

The fog pattern, on which the effectiveness of the nozzle depends, is maintained even at greatly reduced water pressures, thus assuring an efficient fog under widely varying conditions. Air currents, whether external or internal, do not affect its action.

Miter Gear Boxes QC 816

Brooks Equipment Corp. have recently released a series of new type miter gear boxes and brackets. Great strength and resistance to shock characterize the fabricated steel construction. Extra long hubs provide for generous self lubricating Oilite bearings and oil reservoir. Also, they are a convenient place for support of the gear box by the clamp brackets which are designed to allow line up in one place during installation. Oil sealed and plain types are offered in shaft sizes ranging from ½" to 1½" diameter. Gear dimensions and horse power ratings are in accordance with standard power transmission practice.

Fire Extinguisher QC 817

The General Detroit Corp. and The General Pacific Corp. announce a carbon dioxide portable fire extinguisher in sizes ranging from 2 to 100 lbs. Called CD-Sno Fog, the extinguisher is one of a complete line of Underwriters' approved fire extinguishers.

CD-Sno Fog is especially recommended

for fighting fires in electrical equipment, oil, grease, and flammable liquids. Since the carbon dioxide is a non-conductor, it is safe to use on electrical fires even while the current is on. It leaves no stain on clothing, equipment, or premises, and is harmless even when used around food. It is equally effective in hot or sub-zero temperature. The cylinder of the extinguisher is made of high-grade steel, with brass fittings. The discharge horn is of shock-resisting plastic construction.

CD-Sno Fog is made in 2, 4, 7½, 10, 15, 20, 50, 75, and 100 lb. sizes. Underwriters' Classification for the 15 lb. size is B-1, C-1.

Work Glove QC 818

A quality canvas work glove, impregnated with oil-and-acid resistant milled neoprene, manufactured by the Synthetic Division of The Pioneer Rubber Co., offers a new type of protection on jobs that are too wet and sloppy for other types of work gloves. According to the manufacturer, the milled neoprene used is tougher and more durable than the latex type, thus offering dependable protection and extra long wear. The impregnating process is such that the canvas and neoprene are joined in a permanent bond, not merely coated. This impregnating process results in a rough adhesive surface, giving the further advantage of a non-slip grip, making the glove especially valuable in the handling of wet slippery objects. It is manufactured with both a knit and gauntlet wrist, the glove is furnished in one standard size.

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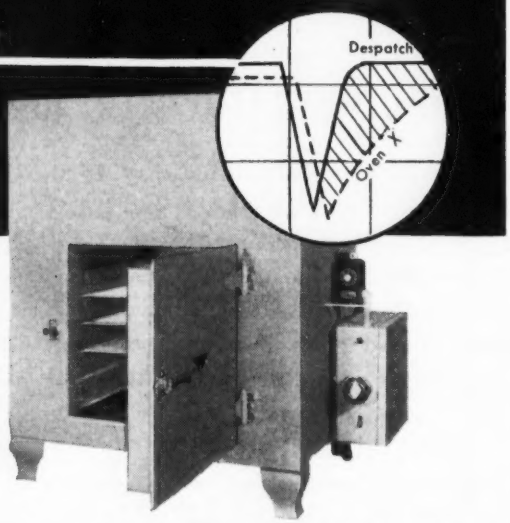

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by T. PAT CALLAHAN

Rubber-Lined Tank Cars

RUBBER-LINED tank cars were first manufactured in 1924, and since that time tremendous strides in improving this type of car have taken place. Improvements in construction of tanks, application of rubber, and the quality of rubber have advanced so that today one of the safest and most practical tank cars in use by the chemical industry is the rubber-lined car.

T. Pat Callahan

This car is built to ICC Specifications 103B and 103BW. The 103B car is of riveted type construction, and the 103BW is welded. These tank cars are chiefly used for the transportation of muriatic and phosphoric acids, but are used to lesser extent in the movement of other commodities, such as ferric chloride, formaldehyde, etc.

When the first rubber-lined tank cars were manufactured, it was anticipated that the life of the car would extend from 1 to 1½ years in hydrochloric acid service. Cars built at this time, however, continued in service for many years, and we know of a case where one of the earlier lined cars was in service 15 years later. Various improvements in the lining of tanks with rubber have now been made, so that with proper care these cars should last for a great many years.

Experience has proved that the most important thing for users to keep in mind is that proper care must be given to the exterior of the tank to avoid drip or splash of acid on the outside. The extra care taken in removing the man-hole cover and other fittings and in replacing them is a good investment. Periodic inspections of all rubber-lined cars in order to discover any damage that might have occurred are urged, since small cuts in the rubber will eventually necessitate major repairs if not attended to. Particular care in using measuring rods with sharp points must be observed, for this is a very frequent source of injury to rubber linings.

Until a few years ago cars were constructed by riveting. This made it very difficult to do a satisfactory lining job, for placing the lining over the rivets was obviously a difficult task.

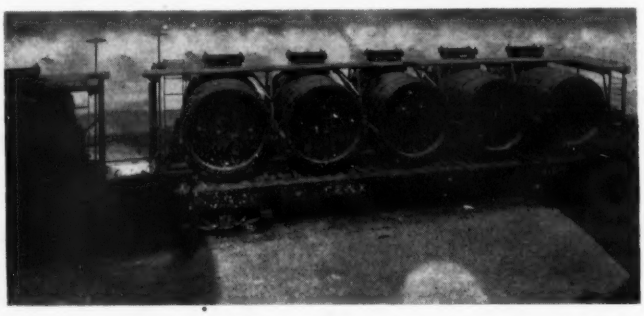
The ICC approved the construction of fusion-welded tank cars a few years ago, and now a much more satisfactory lining job can be done on cars of fusion welded construction.

For users of materials shipped in rubber-lined tank cars, one of the large shippers has forwarded to their customers the following set of instructions which we think very helpful to both the shipper and consumer in protecting the rubber lining in tank cars. These instructions follow:

IMPORTANT

INFORMATION ON UNLOADING RUBBER LINED TANK CARS. PLEASE REFER TO PERSON WHO EMPTIES TANK CARS.

In unloading rubber-lined tank cars, please observe the following:



Wood tanks molded on flat cars were used to transport muriatic acid prior to the development of rubber-lined tank cars.

Left, application of rubber lining to riveted tank car; right, stitching or rolling seam in fusion-welded rubber-lined car. The comparison shows the greater difficulty in lining riveted cars.

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We're a big family—and *growing!* That's the gist of current Continental advertising in leading magazines. So keep your eye on Continental and on the Continental Triple-C trademark . . . it stands for best in quality, best in service, too!

Tune in "Continental Celebrity Club," every week over coast-to-coast CBS Network

TIME
*Plastic handles for coffee pots . . . And cans for insecticides
*Household ware named Decoware . . . And cans for meat besides
ALL ARE MADE BY CONTINENTAL CAN COMPANY
MEMO
Continental stands behind the scenes... behind the labels of America's finest products

1. Be sure car is braked properly before making unloading connections.
2. It is unnecessary to remove dome cover. Sampling or measuring of contents may be done through the air vent.
3. Please do not use iron pipes, or rods of any hard substance in measuring tanks. Measuring rods should be of wood. If the rubber lining in the tank is punctured, future acid shipped in tank car will be contaminated.
4. Remove standard 2" rubber-covered flange over the words AIR—OPEN FIRST, which are stencilled on side of dome. Loosen bolts on this flange very gradually to avoid sudden release of pressure.
5. Remove flange from over words ACID—OPEN LAST. Never open this pipe before opening air vent.
6. Connect unloading lines to discharge pipe.
7. Connect air line to air vent pipe.
8. Twenty lbs. of air is sufficient to unload tank in reasonably short time. In no event should over 25 lbs. be used. If air line exceeds 25 lbs. a reducing valve and a relief valve set at 25 lbs. should be installed.
9. When tank is empty disconnect AIR line first. Allow unloading lines to drain back into car, disconnect discharge pipe and replace flanges on air vent and discharge pipes.
10. If acid should spill on outside of tank while unloading, wash off with water as soon as possible. Muriatic acid attacks steel very readily.
11. The rubber lining of our tank cars will be seriously affected if water or other chemicals are allowed to come in contact with the rubber. We request that nothing be added to the acid while in our tank cars.

Chemical Containers Still Critical

Despite the fact that the war has ended, the procurement of chemical containers remains very difficult. For some time to come practically all containers will be in very tight supply, and it is definitely felt that attention to this important detail is just as necessary now and for the future as it has been during the past four years. One of the most serious difficulties is a definite shortage of light-gauge steel containers.

A great many of the large chemical companies are again requesting the return of single-trip drums for reuse, and it becomes quite apparent that unless this practice is adhered to, shortages of this type of container will occur.

It is suggested that attention be focused on the container supply within any individual's plant and that it be watched very carefully.

Paper Box Booklet Published by Institute

Publication of the second booklet of its series, "Packaging in World War II", the story of set-up paper box manufacture, has been announced by the Packaging Institute.

Willard F. Deveneau, editor of the series which will document all phases of packaging during the war when it is completed, compiled the story of set-up box wartime uses in collaboration with members of the National Paper Box Manufacturers Association. The first of the series, plastics packaging, was published by the Packaging Institute last autumn.

Walton Lynch, president of the Packaging Institute, has announced that others of the series, treating with wartime developments in packaging machinery and corrugated shipping containers, will appear in the spring and summer of 1946.

Carboy Truck

Recently designed by Palmer-Shile Company, a new carboy truck is especially suited for easy loading and convenient handling of carboys. One rolls the truck up against the carboy and drops the gripping yoke over the top as illustrated:

when the truck handles are pulled back, loading becomes automatic. Hardened steel studs on the truck frame hold the load in place. To unload one simply tips the truck forward and releases the gripping yoke.

Construction is all steel, and the overall width is only 20", which permits passage through narrow doorways and crowded aisles. Weighing 75 lbs., its capacity is 500 lbs.

Packaging Liner

Aquastop, a new synthetic, impregnated, coated and chemically-treated strong, tough, flexible and resilient waterproof packing liner fabric, has been introduced

by the Protective Coatings Corporation, 689 Main Street, Belleville 9, N. J.

With the use of Aquastop, an actual "breathing" package is obtained. For, while a complete waterproofing is accomplished, moisture vapor as high as 10 grams per 100 square inches per 24 hours is transmissible. This unusual "breathing" property of Aquastop resists corrosion from condensation within the package due to temperature changes.

Aquastop will withstand exposure to changes in temperature from —20°F. to +175°F. at maximum relative humidity, without cracking, tackiness, flow, loss of flexibility or waterproofness.

General Box Now Manufacturing Pallets

Important to users of containers is the recent announcement by the General Box Co. that it is now manufacturing shipping pallets and skids. The General Box pallet will be known to the trade as "Generalift."

According to General Box officials, the design of the "Generalift" pallet will follow the "Part of the Product" policy already established by General Box Company. "Problems of handling and shipping, which the adoption of pallets may help to solve, will be studied by General Box engineers, and from their findings we will design 'Generalifts' to meet individual needs," stated Mr. E. E. Ames, director of sales at General Box.

Orders are now being acepted by General Box Company for pallets, and it is hoped that full-scale production will be reached in the near future.

Shipment of Chemicals By Air Studied

Foreseeing increased demands for air shipment of inflammable materials and gases, provision has been made by the scheduled air lines to investigate the feasibility of flying various types of these commodities.

The study will be made by the Shippers' Research Division, recently formed by the 24 United States flag airlines comprising the Air Transport Association of America, for the purpose of studying and preparing regulations dealing with the safe movement of hazardous items by air carriers.

The first class of materials to be probed will be inflammable liquids. Such considerations as lowering a flash point with altitude, significance of explosive limits, spontaneous ignition temperatures, vapor pressure and other points have never been evaluated, and therefore a study of these properties as they affect safe air transportation is felt to be necessary.

Since present Civil Air Regulations permit the carriage of highly dangerous compressed gases such as hydrogen, bu-

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U.S.I. CHEMICAL NEWS

APRIL ★ A Monthly Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1946

Vanillic Acid Esters Are New Preservatives

Tests conducted recently indicate that esters of vanillic acid are potent agents against microorganisms — particularly molds and heat-resistant bacteria. Since these compounds are claimed to be nontoxic as well, it is likely that they will be used as preservatives for perishable foodstuffs shipped or stored without benefit of refrigeration. At present, sodium benzoate is the only preservative used for this purpose.

Laboratory studies have shown that, in general, the anti-microbial efficiency increases with increasing weight up to the butyl ester, and then decreases. Actual food preservation studies demonstrate the efficiency of vanillic acid esters in preserving salt fish, fresh fruit juices, vegetable juices, cheese spreads and bread.

The esters were produced by dissolving vanillic acid in the desired anhydrous alcohol, then either saturating the solution with dry hydrogen chloride, or adding sulphuric acid and boiling for a short time under reflux. The esters are substantially odorless and tasteless. The discovery is reported in a technical paper published recently.

Tall Oil Constituents Separated by New Method

An improved process for separating tall oil into its main constituents — fatty and resinic acids — is claimed in a recent patent. Tall oil, or "talloel," which is Swedish for pine oil, is the chief by-product in the production of paper pulp from resin-bearing woods by the so-called "sulphate process."

According to the separation method described in the patent, the tall oil is first treated with esterifying agents, preferably monohydric alcohols. The esterified oil is then dissolved in a suitable solvent which retains the resinic acids, or derivatives, in solution at low temperatures. The solution is chilled, and the fatty acid esters separate out. Some of the solvents employed are: acetone, ethyl methyl ketone, and ethylene dichloride.

THE MONTH IN CHEMURGY

A new product from sugar will help make resins, plastics, and food products... Bamboo is used as a raw material in the manufacture of rayon . . . An improved "milk" is made from soybeans . . . Oil bearing seeds are seen as a new source for proteins . . . A modified cotton fabric will not mildew or rot . . . A chewing gum base is prepared with the aid of sunflower, peanut, and oiticia seeds . . . A new book on chemurgy is published . . . Food yeast is produced from the waste liquor in the process of pulping beech wood . . . A new company is formed to produce glucose from wheat . . . An inexpensive type of buckwheat will supply large quantities of a drug helpful to those afflicted with high blood pressure . . . Peanut butter can now be made in orange, vanilla or chocolate flavored bricks which can be sliced and laid on bread like cheese.

Wool Shrinkage Eliminated By New Chemical Treatment

Wool can now be stabilized against laundry shrinkage, according to the claims made in a patent issued recently. Shrinkproofness is accomplished by a chemical process which involves the use of a defelting agent and a synthetic resin-forming material.

In the first step of this process, the wool is treated with a solution of potassium hydroxide in ethyl alcohol in order to reduce the felting quality. This treatment is stopped when the wool has lost approximately 16.7% of its initial tensile strength. It is then treated with a synthetic resin-forming material in water dispersion containing not more than 6% solids. The resin-forming material is then cured.

The American Wool Council warns, however, that it will take one or two years of technological development before "washable" woolens will be flooding retail counters.

New Compounds Rival Penicillin and DDT

Two of the most publicized of the wartime chemical developments—penicillin and DDT—are already being equalled or bettered, according to recent announcements. A new insecticide, known as "1068," is said to be several times more toxic to insects than DDT, and a synthetic benzyl derivative is claimed to rival penicillin in therapeutic value.

Arsenic Antidote Found

A new and effective antidote for arsenic poisoning is the result of 20 years work by British scientists. Known as 2,3-dithiopropanol, this new drug is reported to remove the poison from the tissue by forming an arsenic addition compound which the body excretes. It is administered by injection, using peanut oil and benzyl benzoate as the vehicle.

New Quick-Dry Resin Meets Demands for Lowered Oil Content

Aroplaz 1314 Replaces Aroplaz 1306 — Exhibits Many Similar Properties

In response to the current urgent demands for lower oil-content resins, U.S.I. now offers its new alkyd-type resin, Aroplaz 1314. Designed as a replacement for U.S.I.'s highly popular Aroplaz 1306, it contains 12 per cent less oil on the solvent free basis than the older resin, yet exhibits approximately the same superior qualities. Manufacturers will find the resin suited for use in architectural and industrial coatings of the brushing, dipping or spraying types.

Properties

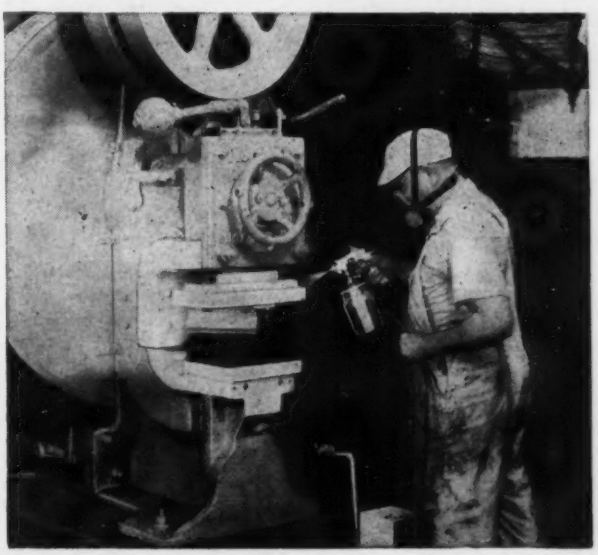
Aroplaz 1314 is a hard resin modified, phthalic-free, oxidizing alkyd-type resin of medium oil length. It is even faster drying than Aroplaz 1306 — air-drying to hard, tack-free finishes overnight, and baking hard in ¾ to 1 hour at 250 degrees F. Finishes prepared with Aroplaz 1314 have moderately good flexibility, and good resistance to water and alkali.

(Continued on next page)

Specification for Aroplaz 1314

Solution: 74-76% solids in Mineral Spirits	
Viscosity (G.H.):	**Z-Z_2**
Acid Number (solvent free basis):	**9-13**
Color (G.H. 1933)	**8-10**
Weight per gallon at 25°C.:	**7.9-8.0 lbs.**
Oil Content (solvent free basis):	**54%**
Phthalic Anhydride Content:	**None**

Solubility: Complete in petroleum and coal-tar solvents; insoluble in ethyl alcohol. Compatible with many oils, resins and alkyds.



Popular with safety engineers is the new system of painting plant machinery in eye-catching colors that call workers' attention to danger areas and set off moving parts against contrasting backgrounds. Here a punch press is being painted to remove the camouflage of solid drab colors. Aroplaz 1314 and other U.S.I. resins add durability and flexibility to many coatings used in this new and improved safety technique.

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APRIL ★ **U.S.I. CHEMICAL NEWS** ★ 1946

New Alkyd-Type Resin

(Continued from preceding page)

Aroplaz 1314 is pale in color. Coatings made from it not only have good initial color, but exhibit high color-retentive properties as well. White enamels made with this new resin approach the whiteness of enamels based on phthalic-alkyd resins. In gloss and gloss retention, it is superior, in both clear and pigmented films, to many alkyds.

Wide Uses

Manufacturers will find this new resin ideal

Aroplaz 1314 — excellent for interior finishes —is helping to meet the current demand for resins with reduced oil content.

for use in a wide range of air-dry or low-bake industrial finishes – white or colored. It will also prove popular in numerous interior architectural coatings. However, finishes prepared with Aroplaz 1314 have only moderately good exterior durability. This property, though, can be improved by the addition of relatively small quantities of bodied oils.

Highly Acidic Fatty Oils Purified by New Process

The purification of fatty oils containing strong acids is described in a recent French patent. According to the claims made, the acidic oils are first neutralized with the equivalent amount of alkali, producing a mixture of oils and soap. The oils are separated from the soap by extraction with a soap solvent such as acetone, ethyl alcohol, methanol, or their mixtures. Separation of the soap solution is effected by mechanical means.

Ultrasonic Energy Now Available for Research

Ultrasonics—the region of sound frequencies higher than our ear can hear—is opening one of the newest and most interesting research fields. This new force has been engineered into a single compact laboratory instrument which is solving research problems in chemical, metallurgical, biological, and medical laboratories, according to the manufacturer's announcement.

About the size of a good-sized radio, this instrument operates on any 110 volt, 50-60 cycle line, and produces over 500 volts of high frequency energy. Highly accurate ground quartz crystals control the frequency of the oscillations produced. Four frequencies are possible—100, 400, 700 and 1000 kilocycles per second.

Among the interesting effects reported to be produced by this instrument are: the production of hydrogen peroxide from water, the oxidation of potassium iodide to free iodine, the emulsification of mercury and water, the destruction of pathogenic bacteria, the decrease in germination time of seeds, and the sterilization of milk and other liquids.

Quick-Curing Neoprene

Neoprene compounds can be quickly cured at low temperatures by adding from 0.1 to 35 parts of sulphur chloride, according to the claims made in a recently-issued patent. The addition of small amounts of ethyl alcohol, amyl alcohol, or a ketone, such as acetone is said to prevent gelation.

Invention of New Plastics Claimed in British Patent

The preparation of a new series of plastic compounds is described in a recently-issued British patent. These compounds are produced when a linear-polyamide-forming substance, such as a hexamethylene-diammonium salt of adipic acid, is reacted with a formaldehyde condensation product in the presence of butyl alcohol. The condensation product is the result of the reaction of formaldehyde with one or more of the following substances: urea, thioureas, guadidine, substituted guanidines, aminotriazines, and substituted aminotriazines. The plastics are said to be useful in the manufacture of decorative or protective film-forming compounds.

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

To extend the life of concrete and terrazo floors, a special liquid is offered for application. It is claimed to give protection against the effects of alternate freezing and thawing, as well as the disintegration resulting from concrete dust. **(No. 053)**

U S I

A colorless waterproofing liquid is claimed to provide moisture protection for stone, brick, and stucco exteriors. The product is described as becoming invisible on drying. **(No. 054)**

U S I

An acid-resistant wood, said to withstand the attacks of moisture, decay, and insects, has been announced. It is claimed to weigh more and to be harder than ordinary wood. **(No. 055)**

U S I

A new moth proofer, claimed to be non-toxic and non-inflammable, is reported to impregnate wool fabric evenly and quickly. It is stated to be unaffected by dry cleaning or exposure to the air. **(No. 056)**

U S I

To dye nylon, a dye carrying penetrant is offered which is said to produce exceptional evenness of color, and to simplify and improve the dyeing process. **(No. 057)**

U S I

To remove rust, a new compound, claimed to be relatively non-corrosive to steel even after long exposure, is offered for application by brush, spray, or dip methods. **(No. 058)**

U S I

A new textile softener now makes it possible to control almost completely the smoothness and suppleness of all types of fabrics regardless of what other types of chemical treatment they receive, according to the claims made by the manufacturer. **(No. 059)**

U S I

A new stainproof wall covering is reported to have withstood severe wear and tear in numerous public places such as government office buildings, restaurants, theatres, and hotels, according to claims made. Heretofore indelible stains, such as lipstick, hot grease, crayon, and ink may be easily washed off. **(No. 060)**

U S I

A new universal slide rule, made of plastic, is described as having razor-sharp graduations resulting in extreme accuracy. The new 10-inch rule is claimed to be easy to read and to operate. **(No. 061)**

U S I

A new-type grinding mill is reported to speed up the manufacture of fine dispersions (of particle sizes of one micron or less). The machine is described as containing very few wearing parts. **(No. 062)**

U S I

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Diethyl Phthalate

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Acetoacet-ortho-anisidide
Acetoacet-ortho-chloranilide
Acetoacet-ortho-toluidide
Acetoacet-para-chloranilide
Alpha-acetylbutyrolactone
5-Chloro-2-pentanone
5-Diethylamino-2-pentanone
Ethyl Acetoacetate
Ethyl Benzoylacetate
Ethyl Alpha-Oxalpropionate
Ethyl Sodium Oxalacetate
Methyl Cyclopropyl Ketone

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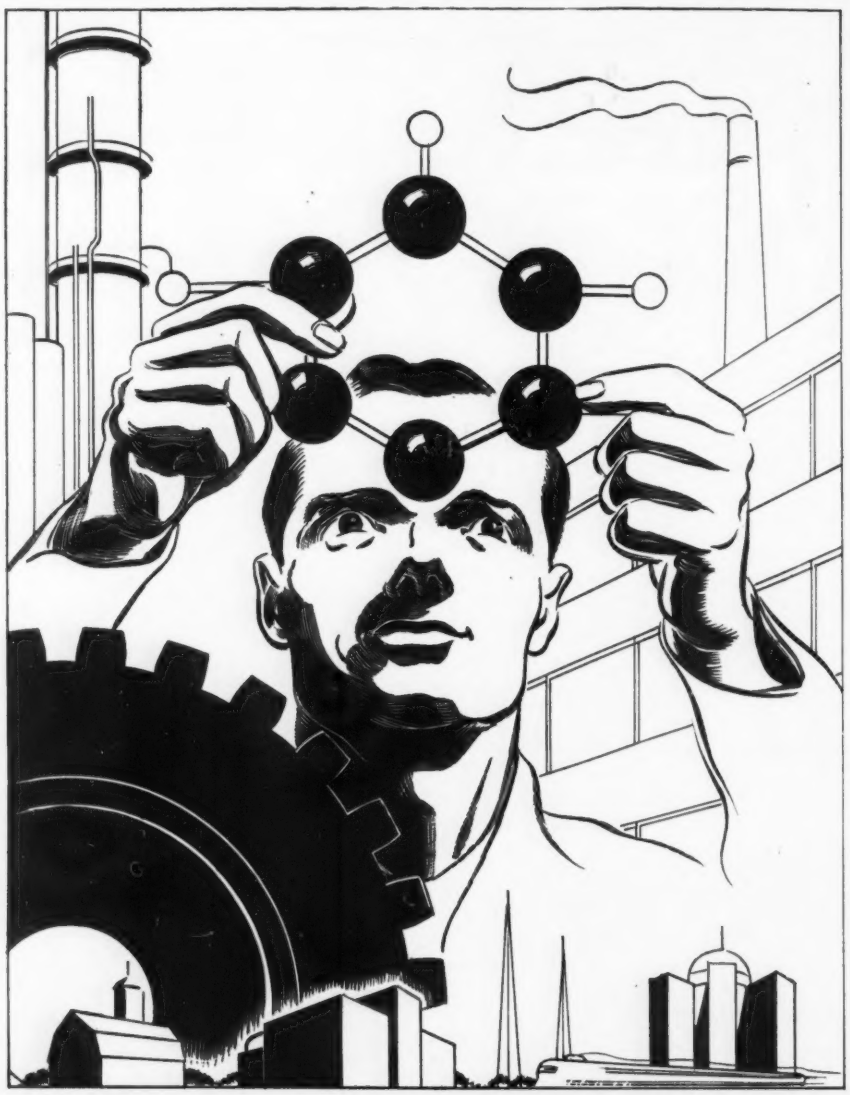

CHICAGO COLISEUM

NATIONAL CHEMICAL EXPOSITION

SEPT. 10, 11, 12, 13, 14

☆ 1946 ☆

tane, chlorine and sulphur dioxide, there is a need for careful study of present requirements for cylinders viewed in the light of the type of handling and conditions which they will encounter when transported by air.

The project will involve a complete program of analysis and testing of present packaging regulations and will require studies directed toward the setting up of packaging specifications.

Nickel Drums for Benzyl Chloride

At a meeting of the Interstate Commerce Commission held in Washington on February 13, 1946, the following amendment to the regulations was approved. Section 247, sub-paragraph J, was amended as follows:

> ICC Spec. 5K. Nickel drums, authorized for Benzyl Chloride. When shipped in unstabilized condition, the lading must be anhydrous and must be free from impurities such as iron.

The Commission on the same date made certain amendments to the table, paragraph (K), section 303. These amendments refer specifically to anhydrous ammonia and insecticide liquefied gas. Any company which handles these products should refer to this amendment which concerns the cylinders which may be used. A further amendment to the Interstate Commerce Commission regulations concerns shipments of cyanides or cyanide mixtures, both by rail freight and by common, contract or private carriers by public highway. The amendment as it now reads is as follows:

> "Cyanides or cyanide mixtures must not be loaded or stored with acids or corrosive liquids."

Changes in ICC Regulations

The Interstate Commerce Commission on January 23, 1946, amended the regulations for the transportation of explosives and other dangerous articles. We list the amendments and additions to the regulations as they affect the chemical industry.

Section 110 (a) (7) was amended by addition of the word "metal" to pails and kits, making it mandatory that when pails and kits are used under this regulation, this form of package must be constructed of metal when used as an inside container. The outside container under this paragraph refers to Specification 11A or 11B wooden barrel.

Section 110 (a) (9) was amended for the same reason as section (a) (7). The section refers to metal pails, kits or cans when packed in Specification ICC 15A, 15B, 15C, 16A or 19A wooden boxes.

Section 113 (h) has been cancelled from the regulations. This section formerly permitted shipment of certain forms of paint in fibreboard containers Specification ICC 12L.

Section 117 (a) is amended by the inclusion of pyroxylin cements in addition

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to rubber cements, which were already in the regulations. Same packaging as formerly prescribed for rubber cements now applies to pyroxylin cements.

Sections 170 and 170 (b) have been amended to read as follows:

"170(a) Fibers or fabrics impregnated, saturated or coated with animal or vegetable oils, or organic substances, manufactured articles or processed materials which are liable to spontaneous heating or combustion in transit must be packed in hermetically sealed metal-lined wooden boxes or air-tight metal containers.
"(b) Such materials, substances or articles must not be offered for transportation by rail express."

The reason for this change is as follows:

"There have recently been developed several types of materials that unless properly processed, aired, or dried, will develop spontaneous heating and in most cases ignition in transit. These materials consist of dried grain, rain coats, tobacco pouches, roofing felt, roofing material, composition sheathing, etc."

Section 191 (a) adds phosphorus sesquisulfide to the list of dangerous articles which must be packed in specific containers as follows:

"(b) Spec. 15A or 15B.—Wooden boxes with metal inside containers hermetically sealed (soldered), or in water-tight metal cans with screw-top closures.
"(c) Spec. 6A, 6B or 6C.—Metal barrels or drums, not over 30 gallons capacity each."

Section 206 (a) is amended for the shipment of metallic sodium or potassium to include, in addition to other containers already specified, ICC5 steel drum.

Section 206 (b) (2) is amended to include, in addition to containers already specified, ICC Specification 37D (single trip), which have welded side seams, net weight not over 30 pounds.

Section 207 (b) (7) has been cancelled. This applies to Specification 11A slack barrels with heavy wax duplex (asphalt laminated) Kraft paper lined and extra head battens. These have been declared unsatisfactory for the shipment of sodium sulfide concentrate, ground.

Section 263 (a) (10) has been amended by the addition of Specification MC-310. This is to provide for tank motor vehicles, rubber-lined, for the shipments of hydrochloric acid.

Sections 264 (k) (1), (k) (2), (k) (3), and (k) (4) have been amended as follows and we quote this complete amendment:

"(k)(1) Spec. 5D.—Lined metal barrels or drums. Authorized only for acid not over 62 per cent strength. Any barrel or drum that shows evidence of damage must be tested before shipment for defects in lining in the manner prescribed in paragraph 15 of Spec. 5D. Lining materials must meet the tests prescribed in sub-paragraphs (k)(2) and (k)(3).
"(k)(2) Performance Test.—Test panels of linings for drums in HF acid service must be subjected to a test in 62 per cent HF for a period of not less than 90 days. At the end of such period there must be no signs of deterioration of such lining material from chemical attack as evidenced by changes in its physical characteristics, and no signs of permeation of HF through the sample as evidenced by blistering from the metal insert.
"(k)(3) Method of Test.—The test panel should be at least 2" by 6" with a steel insert completely covered by lining material. Test panels should be immersed in 62 per cent HF so that 50 per cent of the panel is in contact with liquid and 50 per cent in contact with vapor. Temperature of test to be maintained at 130°F. for the entire 90 days.
"(k)(4) Drums must be lined with material at least as thick as the sample material tested."

The purpose of this amendment is to provide a container lined with newly developed synthetic materials which have been found to be as good as or better than any existing container for the shipment of hydrofluoric acid.

Section 266 was amended by the addition of (a) (3) (b) as follows:

"Spec. 1D—Boxed glass carboys of not over 6.5 gallons nominal capacity; authorized only for strengths not to exceed 35 per cent (130 volume) H_2O_2. Means shall be provided so that accumulated pressure in bottle shall not exceed 10 p.s.i. gauge at 130°F. or shall vent at a pressure not to exceed 10 p.s.i. gauge. The cushioning must be incombustible mineral material, elastic wood-strip packing, or large elastic cushions such as corks fastened securely in position. The use of hay, excelsior, ground cork, or similar material, whether treated or untreated, is prohibited."

This provides additional containers for the shipment of hydrogen peroxide.

Section 267 (a) has been amended, and we quote this complete amendment:

"(a) Mixtures of hydrofluoric acid and sulphuric acid, containing not more than 80 per cent by weight and not less than 70 per cent by weight of HF and H_2SO_4 combined, with the HF content not less than 25 per cent by weight in any case, must be packed in specification containers as follows:
"(b)(1) Specification 5A.—Unlined metal barrels or drums which have been subjected to an adequate passification or neutralization process (*see note*). Containers must be filled to not over 80 per cent of capacity at 68°F. If containers are washed out with water, they must be repassified before shipment.
"NOTE.—Each metal container, before being put into this service, must be passified by the following or an equally efficient method: by filling drum to 90 per cent of capacity with hydrofluoric acid of 58 per cent strength and allowing drum to stand 48 hours at a temperature of 80°F., and then 7 hours at 140°F., the internal pressure maintained at atmospheric pressure by means of a ventilated bung.
"(b)(2) Containers not exceeding 55 gallons capacity each are authorized for carload, truckload, less-than-carload, and less-than-truckload shipment. Containers exceeding 55 gallons capacity each are authorized for carload or truckload shipments only but they must be loaded by consignor and unloaded by consignee.
"(b)(3) For less-than-carload or less-than-truck-load shipments, containers must be of metal at least as heavy as 14 gauge United States Standard for not over 20 gallons capacity each, or 12 gauge for not over 55 gallons capacity each. Each container must be subjected to at least one of the following tests before shipment: By interior pressure of at least 15 pounds per square inch before filling or by holding for inspection for at least 24 hours after filling. In either case, each container must be vented **prior to shipment."**

This amendment has been enacted by the ICC to provide proper containers for the shipment of materials not previously shipped and is based upon results of corrosion, pressure, storage, and gasket tests and considerable plant experience.

Section 272 (g) is amended as follows:

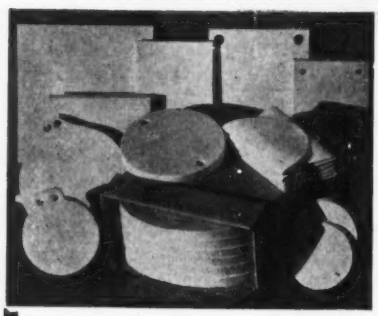
"(g) Spec. 5A.—Metal barrels or drums only for acid of 1.7059 specific gravity (60°Bé tolerance plus 0.2°Bé.); or acid of greater strength with or without inhibitor, provided such acid has a corrosive effect on steel measured at 100°F. no greater than 66°Bé commercial sulfuric acid.

Section 272 (g) (1) is also amended as follows:

"(g)(1) Spec. 17F.—Metal barrels or drums (single trip) only for acid of 1.7059 specific gravity (60°Bé tolerance plus 0.2°Bé tolerance); or acid of greater strength with or without inhibitor, provided such acid has a corrosive effect on steel measured at 100°F. no greater than 66°Bé commercial sulfuric acid."

The reason for this change is to prevent promiscuous shipment of acid of higher strengths, particularly from 99.5% to 100.5% H_2SO_4, where corrosion rates are high if acid is not inhibited.

(Turn to page 677)



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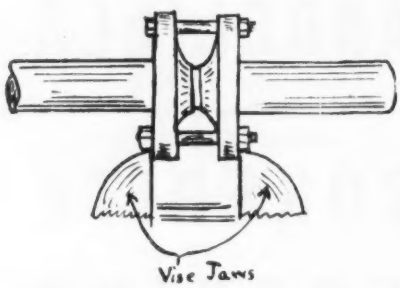
PLANT OPERATIONS NOTEBOOK

Repair of a Leaky Joint Without Pressure Reduction

The sketch below shows a procedure that has been successfully utilized to replace a bolt to tighten a leaky joint in



a high pressure pipe line without emptying the pipe or turning off the pressure.

The bolt is replaced by taking a small vise off a work bench and blocking it securely under the pipe, so that the jaws can firmly catch the edges of the flanges. The jaws are then tightened to relieve the bolt of its stress in order that it can be removed. A new bolt may be inserted and tightened sufficiently to stop the leak, the vise then being removed.

Safety in Formaldehyde Usage

The Bureau of Labor Standards in the United States Department of Labor has announced the availability of a twelve page booklet on the handling of formaldehyde, the third in their series on controlling chemical hazards.

Physical Condition a Factor In Safe Use of Chemicals

As individual susceptibilities to the effects of organic chemicals vary widely, preplacement medical examinations are recommended to determine whether a new employee should be assigned to work which may involve continued exposure.

The first health requirement is that the general physical condition of the employee be good. It is advised that exposure of people with arrested tuberculosis be minimized, as well as those with diabetes, even though the disease is kept inactive through dietary adjustments or the use of insulin. Most authorities also recommend against this type of work for overweight or undernourished individuals and those with disorders of the heart or digestive tract or other chronic illnesses.

It is always important for the physician to know what specific material or materials a worker will have to use, as they differ in their effects. A man with a mild degree of anemia, for example, may be unsuited for work with one material but need not be prevented from working with another.

Recent medical reports indicate that nutrition is an important factor in individual susceptibility to poisoning of this type. A person on a poorly balanced diet, particularly if it is deficient in protein, calcium, or vitamins, or high in fats, may lack normal resistance to the vapors of many chemical products.

Alcoholism is one of the most serious causes of predisposition to chemical poisoning. Men who work with these chemicals should be warned of the special danger attached to the use of alcohol.

Minors and pregnant women are said to have low resistance to most of the chemical hazards of industrial work and it is considered inadvisable for them to work with many chemical products.

A few people have been found to be acutely sensitive to organic solvents or other chemicals only after they begin working with these chemicals. Such individuals should be transferred to work that does not involve the chemical by which they are affected.

Every employee who is subject to prolonged exposure to the vapors of an organic material, even in low concentrations, should have frequent physical examinations at regular intervals, in order to ensure that the material is doing him no harm. Aside from their value in helping to maintain the worker's good physical condition, the record of these examinations may prove important, should any question later arise concerning the individual's health or working conditions.

The advisability of this latter step is borne out by the findings of the Ohio Industrial Service to the Industrial Hygiene Division, U. S. Public Health Service, and noted in the "Industrial Hygiene News Letter". In one test it was found that five out of a staff of twenty chemists, all holding doctorate degrees and some with several years of post-doctorate research experience showed a white blood cell count below 5000, which was arbitrarily established as the critical level. The red cell count of these men remained normal. As a result of these findings the company employing these men plans to include a blood analysis in its preplacement examination of chemists. Improvements in ventilation and other safeguards will be made in the individual research laboratories of the affected personnel, and their condition will be kept under careful medical observation.

It is further pointed out that the problem may be originating in the research laboratories of some universities which may fail to maintain proper safeguards for students and workers with organic chemicals and that chemists whose blood condition is poor may have trouble obtaining employment where a thorough preplacement examination is given.

Ladder Care

The following few rules for the care and use of ladders are taken from Monsanto Safety Briefs.

1. Don't practice false economy. Decide upon the type of ladder you need; then buy the best that is available.

2. Immediately after the ladder is received, and before it is placed in service, shellac or varnish it. Do *not* paint a ladder. Painting will hide defects that may be in the wood.

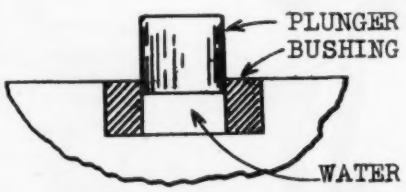
3. Ladders should be inspected regularly (at least every 3 months) with particular attention paid to runs, hardware, and siderails.

4. They should be stored out of the weather in a well-ventilated location. Do not store ladders near steam lines, radiators, or in other places subject to excessive heat or dampness.

5. Be sure that all your men are thoroughly familiar with the care and use of ladders.

Removing a Bushing From a Blind Hole

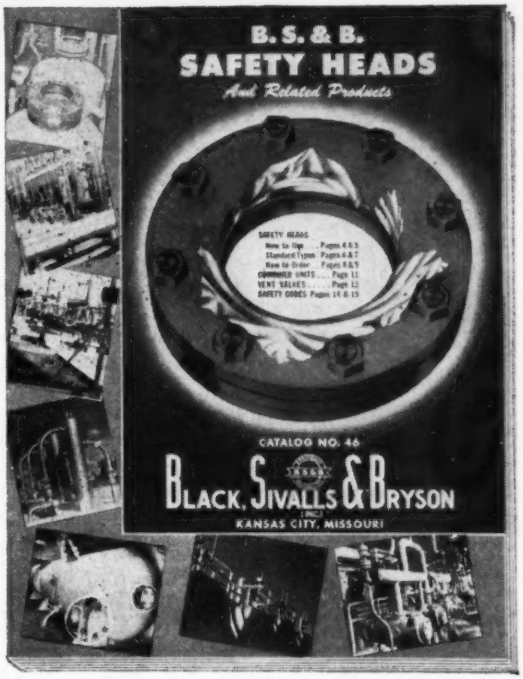
The satisfactory solution to the problem of removing a bushing from a blind hole is illustrated in the accompanying sketch. In operation a close fitting plunger is made out of any suitable material, and water, oil or other liquid is placed in the opening in the manner shown. The plunger is placed as indicated and driven into the opening with a hammer, the liquid forcing the bushing out of the hole



Stainless Steel Tubing Chart

A new slide chart to provide a means of making calculations where stainless steel tubing is used has been made available by the Welded Alloy Tube Division of the Carpenter Steel Co., Kenilworth, N. J.

The chart contains data on cross sectional areas of tubing of various sizes, information on pressures and a table of weights and other physical properties for the principal sizes and gauges of tubing which are available.



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LABORATORY NOTEBOOK

Specially Designed Infrared Spectroscope

The infrared spectroscope performs analyses many times faster and more accurately than any previous method. A specially-designed version of this most modern of spectroscopes has been developed by Dr. Donald K. Coles, Westinghouse Research Laboratories.

To analyze a material—either liquid, solid, or in solution—Dr. Coles places a sample in a special holder and directs through it a beam of infrared light which he produces by heating a silicon-carbide rod to an incandescent glow. Highly-polished mirrors and special prisms guide the light along a thirty-foot-long, zigzag path to highly sensitive receivers that convert the light into electrical current, amplify it, and record the information with an electronic pen on a chart outside the machine. From the peaks and dips on the chart, Dr. Coles can tell what materials are present in the sample, how much of each, the amount of impurities, and other vital facts.

The infrared spectroscope depends for its speed and accuracy on the fact that molecules vibrate at characteristic frequencies. The molecules of carbon in a sample of oil, for example, will vibrate at definite frequency, (depending on the surrounding temperature) while those of hydrogen will vibrate at still another.

The spectroscope ferrets out this frequency by "tuning" the frequency of the infrared beam to that of the material under study. When the two vibrations coincide, the material absorbs the infrared beam and this fact is recorded on the chart by a moving pen. Dr. Coles then matches this frequency against a standard previously determined, and thus identifies the material.

Not only is the infrared spectroscope valuable in its practical applications to industrial processes, but as a pure research tool it enables scientists to uncover facts about molecular structures.

Temperature-Sensitive Cobalt Alloy

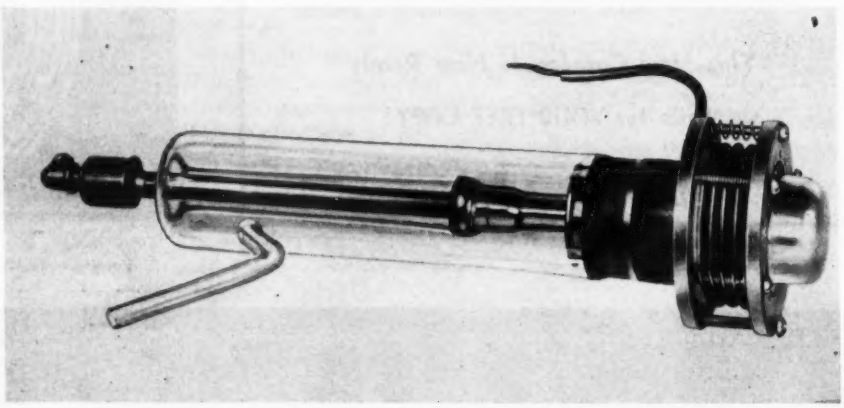
The gas turbine has been forced literally to take its own temperature by General Electric engineers through use of a special metal alloy which tells temperature by color.

The alloy, a chrome-cobalt composition, shows a marked color change for every 25 degree change in temperature from 500°C. to 700°C., then reverts back to its original color and begins the color scale over again in a higher range of from 725° to 900°C. (1652°F). This is believed to be the highest temperature ever recorded accurately inside a gas turbine.

The chrome-cobalt alloy, like most metals, changes color when being oxidized under heat. Unlike other metals, however, this alloy oxidizes so slowly at higher temperatures that each color change occurs regularly at 25-degree intervals thus permitting an actual graduated color scale according to temperature.

But the strangest characteristic of the alloy, according to G-E engineers, is that after it completes one order or scale of colors, it reverts back and repeats these colors in a second order in a second, higher range of temperature.

Wide-Angle X-Ray Tube



A new experimental X-ray tube, produced by Machlett Laboratories, Inc., of Springdale, Conn., emits x-radiation from a hemispherical window throughout the entire 180-degree solid angle with an intensity in excess of five million roentgen units per minute—the equivalent in radiation intensity to 86.4 pounds of radium. A smaller tube, providing over two million roentgen units, is already commercially available.

Direct-reading spectrometer records results, eliminating photographs.

Recording infrared spectroscope utilizes electronics to graph results.

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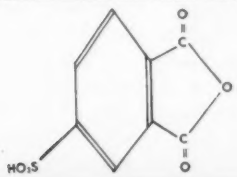

Fluorescent in solution under ultra-violet ray

DATA:

FORM	Reddish brown non-flammable syrup. Will flow freely around 75-80° C. May crystallize partially on long standing.
DENSITY AND SPECIFIC GRAVITY	Specific Gravity at 25° C. = 1.62 Specific Gravity at 90° C. = 1.56 Density = 97.5 lbs./cu. ft.
ACIDITY	Strong acid pH of 1% solution = 1.9
STABILITY	Stable but hygroscopic
SOLUBILITY	Water — very soluble Alcohol — very soluble Ether — insoluble Benzene — insoluble
TENTATIVE SPECIFICATIONS	4—sulfo phthalic anhydride . . 94–97% Free phthalic anhydride . . . . 0.5–1.5% Free SO_3 as H_2SO_4 . . . . . 2–5% Total acidity 26–27 ml N/2 NaOH/gr.

Esters of 4 sulfo phthalic acid may find application as wetting, cleansing, emulsifying, softening and equalizing agents with textiles. Derivatives suggest application as surface active agents. You may see additional possibilities. Samples on request. Product now available in working quantities from our pilot plant. Address: MONSANTO CHEMICAL COMPANY, Merrimac Division, Everett Station, Boston 49, Massachusetts.

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INDUSTRY'S BOOKSHELF

Literature Review of Coal Chemistry

CHEMISTRY OF COAL UTILIZATION. *National Research Council Committee, H. H. Lowry, Editor.*—Two Volumes. John Wiley & Sons, New York, N. Y., 1945. 1868 pages. Price $20.00 Set. Reviewed by Arno C. Fieldner, Bureau of Mines.

This book is a comprehensive and more or less critical review of the accumulated literature on the chemistry of coal and its utilization filling a long-felt need in fuel technology. It is the first review of its kind in any language.

The two volumes contain forty chapters, each devoted to a separate topic and written by an author who, in the words of the editor, "was selected because he was directly engaged in, or closely associated with the work on the subject of his chapter." The more important subjects reviewed include the origin, petrography, classification, chemical constitution, physical properties, and chemical properties of coal; composition, fusibility, and clinkering of coal ash; the cleaning of coal; changes in coal during storage; the action of solvents on coal; coal carbonization; the physical properties and reactivity of coke; gas from coal carbonization and its utilization; removal of sulphur and other impurities and the recovery of ammonia, cyanogen, pyridine, and other nitrogenous compounds from coal gas; the chemical nature, treatment, and recovery of light oil, tar and ammoniacal liquor from coal gas; combustion in fuel beds; combustion of pulverized coal; gas producers and producer gas; water gas; hydrogenation of coal and tar; and synthesis of hydrocarbons and methanol from water gas.

Naturally, with so many different authors, some of the subjects are treated more completely and more critically than others, but most of them give numerous footnote references to the original articles appearing in scientific and technical publications in all languages. There is some overlapping of subject matter in different chapters but no more than is to be expected in a work of this nature. Both industrial fuel technologists and scientific research workers will find much that is helpful to them in their work. Some of this material has been brought together in relatively brief and usable form for the first time, as for example, the chapters on the hydrogenation of coal and carbon monoxide. The chemistry of the combustion of coal and coke is scientifically presented and well-illustrated with sketches of modern industrial equipment. The same is true of the production of producer gas and water gas, and of the various phases of the coal carbonization industry. The research chemist will find an excellent presentation and discussion of modern work on the constitution of coal, its origin and classification.

Plastics Technology

TECHNOLOGY OF PLASTIC AND RESINS, by *J. Philip Mason* (Professor of Chemistry, Boston University) and *Joseph F. Manning* (Research Chemist, BB. Chemical Co., Boston). D. Van Nostrand Co., Inc., New York, 1945. 493 pps., Illust'd. Reviewed by Robert J. Moore, Bakelite Corporation.

This is a good book on the subject. It is up-to-date and maintains a satisfactory balance between theory, chemical structure, processing and uses. Based upon a college course in the chemistry of plastics and resins at Boston University, it is written for those who have some understanding of inorganic and organic chemistry.

The book is divided into three sections. The first, on Macromolecules and their Properties, consists of six chapters, as follows: The Resinous State, the Plastic State, Polymerization, Mechanism of Polymerization, Plastic Properties and their Relation to Chemical Structure, and Macromolecular Studies. Section Two starts with a chapter on the Use of Resins in Industry, and follows with individual chapters on Rubber, Cellulose, Thermosetting Phenolics, Amino Aldehydes, Cellulose Derivatives, Acrylics, Polystrene, Vinyls, Alkyds, Protein Plastics, Miscellaneous Types and Synthetic Rubber. Silicones are covered in an appendix. Section Three on Fabrication includes chapters on Compounding, Molding, Design of Molds, Casting, Laminating, and Coatings.

From the standpoint of printing, illustrations and graphs the book is delightful. The original manuscript was read by Prof. E. A. Hauser, of Massachusetts Institute of Technology, and other specialists, and is notably free of the usual first edition errors. It supplies a definite need for a university text on plastics as well as a "refresher course" for those in the industry.

Oils and Fats

INDUSTRIAL OIL AND FAT PRODUCTS, *by Alton E. Bailey*. Interscience Publishers, Inc., N. Y., 1945. 735 pp. Reviewed by Walter F. Huppke, West Disinfecting Co.

This book fills the need for bringing together the large amount of recent work in this field. The author has given very comprehensive data on those subjects which are likely to be of interest to the most people. Those fields of less interest are discussed in a general manner, however a good bibliography is usually given so that the subject may readily be pursued further if need be.

There is considerable information, not heretofore available, which fills important gaps in the literature. In the field of edible fats and oils good data is given on such unit processes as refining, bleaching, deodorization, and hydrogenation. In the manufacture of soaps he has included a discussion of the new continuous saponification processes of Clayton and Mills.

The book is conveniently divided into four sections: A. The Nature of Fats and Oils. B. Raw Materials for Oil and Fat Products. C. Industrial Utilization of Fats and Oils. D. Unit Processes in Oil and Fat Technology.

Under "A" is given a very comprehensive discussion of the structure and chemical composition of oils and fats, their reactions, physical properties and role in the diet.

Under "B" is included the sources, utilization and classification of oils and fats, production and consumption of primary oils and fats and the characteristics of the individual oils and fats.

Section "C" includes 200 pages on cooking and salad oils, shortening agents, butter and margarine, bakery products, soap, and paints.

Section "D" on unit processes takes up extraction, refining, deodorization, hydrogenation, soapmaking, homogenization and emulsification.

The book is well illustrated with tables, pictures and graphs.

Other Publications

CHLORINE. Outlining the hazards involved in the industrial use of chlorine and methods for their control, a new bulletin from the U. S. Department of Labor will be of interest to firms manufacturing paints, bleaching paper pulp, textiles, and flour; and preserving foods; to laundries, water sterilization and sanitation plants; and to those using refrigerating and dry cleaning solvents and fire extinguishing fluids and engaged in degreasing operations. This is the second in a series on Controlling Chemical Hazards, and is available from the Division of Labor Standards, U. S. Department of Labor, Washington 25, D. C.

REVISTA COLOMBIANA DE QUIMICA, a monthly publication of the Colombian Chemical Society contains approximately 40 pages and is edited by Dr. Jorge Ancizar-Sordo, Apartado 18, Bogota, Colombia.

SYMPOSIUM ON ANALYTICAL COLORIMETRY AND PHOTOMETRY. Sponsored by A. S. T. M. committees on Spectrographic Analysis and Chemical Analysis of metals, this symposium presents a series of discussions by leading authorities under two topics—instrumental section and chemical section. Recent improvements in apparatus for measuring the absorption of light by aqueous solutions, development of superior methods of test based on the use of such apparatus, and use of photometric methods in analytical chemistry are covered. Copies of this 75-page volume can be obtained from A. S. T. M. headquarters, 260 S. Broad St., Philadelphia 2, Pa., at $1.00 per copy.

INDUSTRIAL RESOURCES OF TENNESSEE compiled by George I. Whitlatch outlines the industrial resources of the state. This informative 210-page book, published under the State Planning Commission includes valuable maps, charts, tables and appendix. Copies are available from the commission, Industrial Development Division, 432 Sixth Ave. North, Nashville 3.

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BOOKLETS & CATALOGS

Chemicals

A909. Alkylation Acid Regeneration. The Chemico alkylation acid regeneration process of the Chemical Construction Corp. is discussed in a recent folder.

A910. Allyl Diglycol Carbonate is the subject of a one-page technical bulletin (T-304) of the Columbia Chemical Division of Pittsburgh Plate Glass Co.

A911. Blandol is the subject of the new technical data file prepared by the Department of Industrial Research of L. Sonneborn Sons, Inc.

A912. Bonding and Laminating Resins. "Plyophen Phenolic Resins for Bonding and Laminating" titles a 16-page booklet of Reichhold Chemicals, Inc.

A913. Butadiene Monochlorohydrin. The Columbia Chemical Division of the Pittsburgh Plate Glass Co. has issued a data sheet (T-400) on butadiene monochlorohydrin, 80%.

A914. Butoxyethyl Diglycol Carbonate. The Columbia Chemical Division of the Pittsburgh Plate Glass Co. has issued a one-page technical bulletin (T-301) giving the properties and specifications of butoxyethyl diglycol carbonate.

A915. DDT. The Pennsylvania Salt Mfg. Co. has prepared a new 4-page booklet on Penco DDT products.

A916. Essential Oils. "U. S. A. Grown and Distilled Essential Oils" titles a recent 12-page booklet which is available from Magnus, Mabee & Reynard, Inc.

A917. Hydrogen. The Girdler Corp. has just issued a 32-page book which reviews the commercial methods of producing hydrogen.

A918. Ion Exchange. "Properties and Uses of Duolite Ion Exchangers" titles a 32-page booklet which has been made available by the Chemical Process Co.

A919. Mercerization. "A Test for Mercerization" titles a recent 8-page bulletin of the Dexter Chemical Corp.

A920. Mercerizing. "Mercerizing and Dypenol" is the title of a recent 12-page booklet which is available from Dexter Chemical Corp.

A921. Plasticizers are the subject of a recent 42-page book of Ohio-Apex, Inc.

A922. Rubber Tackifier. "Koresin, Tackifier for GR-S Rubber" titles a 4-page bulletin (No. 201) of the General Aniline and Film Corp.

A923. Silicone Rubber. The Dow-Corning Corp. has issued a 4-page bulletin, describing Silastic, their silicone rubber.

A924. Technical Books. The Chemical Publishing Co., Inc. has just issued a new catalog of technical books.

A925. Vinyl Plastics are featured in a new 16-page booklet on its Geon materials of B. F. Goodrich Chemical Co.

Equipment

F645. Adjustable Speed Drive. The Electric Machinery Mfg. Co. has issued a new 16-page booklet (No. 183) covering the E-M adjustable speed drive.

F646. Air Separator. The Swartwout Co. has issued a new 4-page bulletin (No. S-13) describing the Airfuge, combination air separator and trap.

F647. Arc Welding Electrodes. A 32-page catalog of their line of arc welding electrodes has been made available by Wilson Welder and Metals Co. Inc.

F648. Asbestos Insulation. "Careycel, Improved Heat Insulation" titles a recent book of the Philip Carey Manufacturing Co.

F649. Asphalt Flooring. The Philip Carey Mfg. Co. has released a new folder on Careycrete, an industrial asphalt flooring.

F650. Bin Level Control. The Jeffrey Bin-Eye is the subject of a recent folder of the Jeffrey-Traylor Division of the Jeffrey Manufacturing Co.

F651. Brazing Alloys. Sil-Fos and Easy-Flo brazing alloys are described in a 4-page bulletin recently issued by Handy and Harman.

F652. Carbon Dioxide Indicator. The Davis Emergency Equipment Co., Inc. has just issued a circular on their Stack-O-Meter, used for indicating carbon dioxide concentration, stack temperature and draft readings.

F653. Clutch. Hardinge Co., Inc. has just issued a new 8-page bulletin (No. 45) describing the BLM "Auto-Centri" clutch.

F654. Controls and Resistors. Clarostat Mfg. Co., Inc. has just issued a new catalog (No. 46) listing their line of resistors and controls.

F655. Conveyors. "Another Contribution to the Art of Overhead Conveying" titles a recent 4-page folder (2041) issued by the Link-Belt Co.

F656. Crane Cab Cooler. The Dravo Corp. has issued a 4-page bulletin (No. 515) describing their new crane cab cooler.

F657. Electrostatic Separation. The Johnson Process or electrostatic separation is described in a recent 4-page booklet of Ritter Products Corp.

F658. Equipment. Jeffrey handling and processing equipment is the subject of a 32-page catalog (No. 791)

CHEMICAL INDUSTRIES TECHNICAL DATA SERVICE

Chemical Industries, 522 Fifth Ave., New York 18, N. Y. (4-6)

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A912	A920	F647	F655	F663	F672
A913	A921	F648	F656	F664	F673
A914	A922	F649	F657	F665	F674
A915	A923	F650	F658	F666	F675
A916	A924	F651	F659	F667	F676
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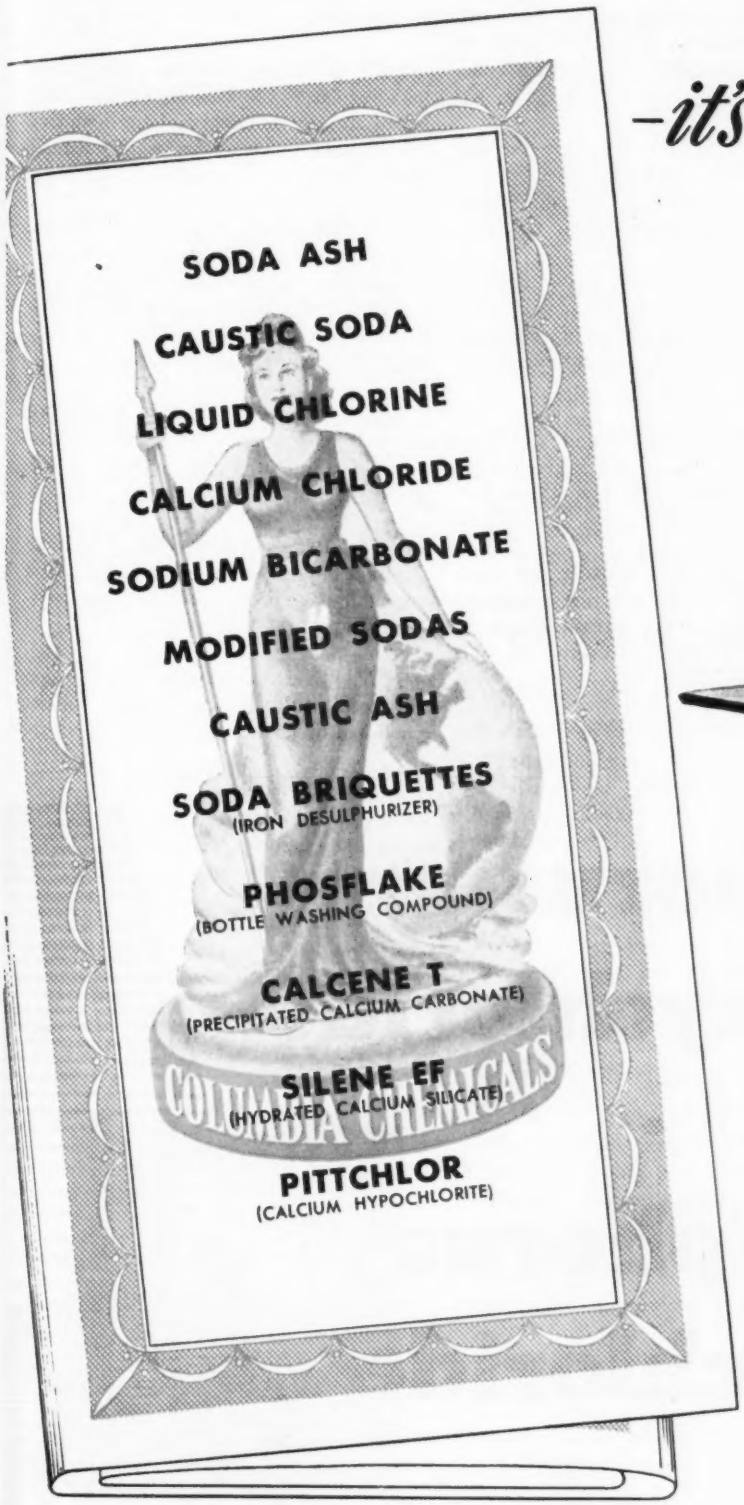

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which is available from the Jeffrey Mfg. Co.

F659. EQUIPMENT. Williams Patent Crusher and Pulverizer Co. has issued a 12-page bulletin (No. 623) describing the various types of equipment which they make.

F660. FIRE EXTINGUISHER. The Cardox Transitank is pictured and described in a recent 4-page bulletin of the Cardox Corp.

F661. GAS ALARM SYSTEM. A new bulletin (No. 1116E) has just been issued by Davis Emergency Equipment Co., Inc. on the Davis combustible gas alarm system.

F662. HEAT TRANSFER AND CRYSTALLIZATION. The Swenson Evaporator Co. Division of Whiting Corp. has announced the availability of a 52-page revised edition of their booklet, "Heat Transfer and Crystallization."

F663. INSULATION. A revised edition of their heat insulation materials catalog, "Heat Insulation for Industry," is available from the Philip Carey Manufacturing Co.

F664. LININGS. "Lining . . . for Industrial and Process Equipment" titles a 4-page bulletin issued by Industrial Lining Engineers, Inc.

F665. LIQUID LEVEL GAGES are the subject of a 4-page bulletin which is available from Jerguson Gage and Valve Co.

F666. METALLURGY. "Go Forward with Metallurgical Answers" titles a recent 4-page booklet issued by Sam Tour & Co., Inc.

F667. MOLDING. Brochure on the subject applying automatic time control for molding presses is available from Automatic Temperature Control Co., Inc.

F668. PACKING CASE LINER. Protective Coatings Corp. has issued a 16-page brochure on the application of Aquastop synthetic impregnated, waterproof, sealed case liners.

F669. PAINT. Information on Pen-Kote 500 maintenance paint is given in an illustrated bulletin of the Peninsular Chemical Products Co.

F670. pH AND CHLORINE CONTROL. W. A. Taylor and Co. has just announced the availability of the seventh edition of their booklet titled, "Modern pH and Chlorine Control."

F671. pH CONTROL. The Bristol Co. has announced a new bulletin (No. pH-1302) describing its line of pH control instruments.

F672. PRECISION CASTINGS. A 20-page booklet, "Haynes Precision Castings," has just been published by Haynes Stellite Co.

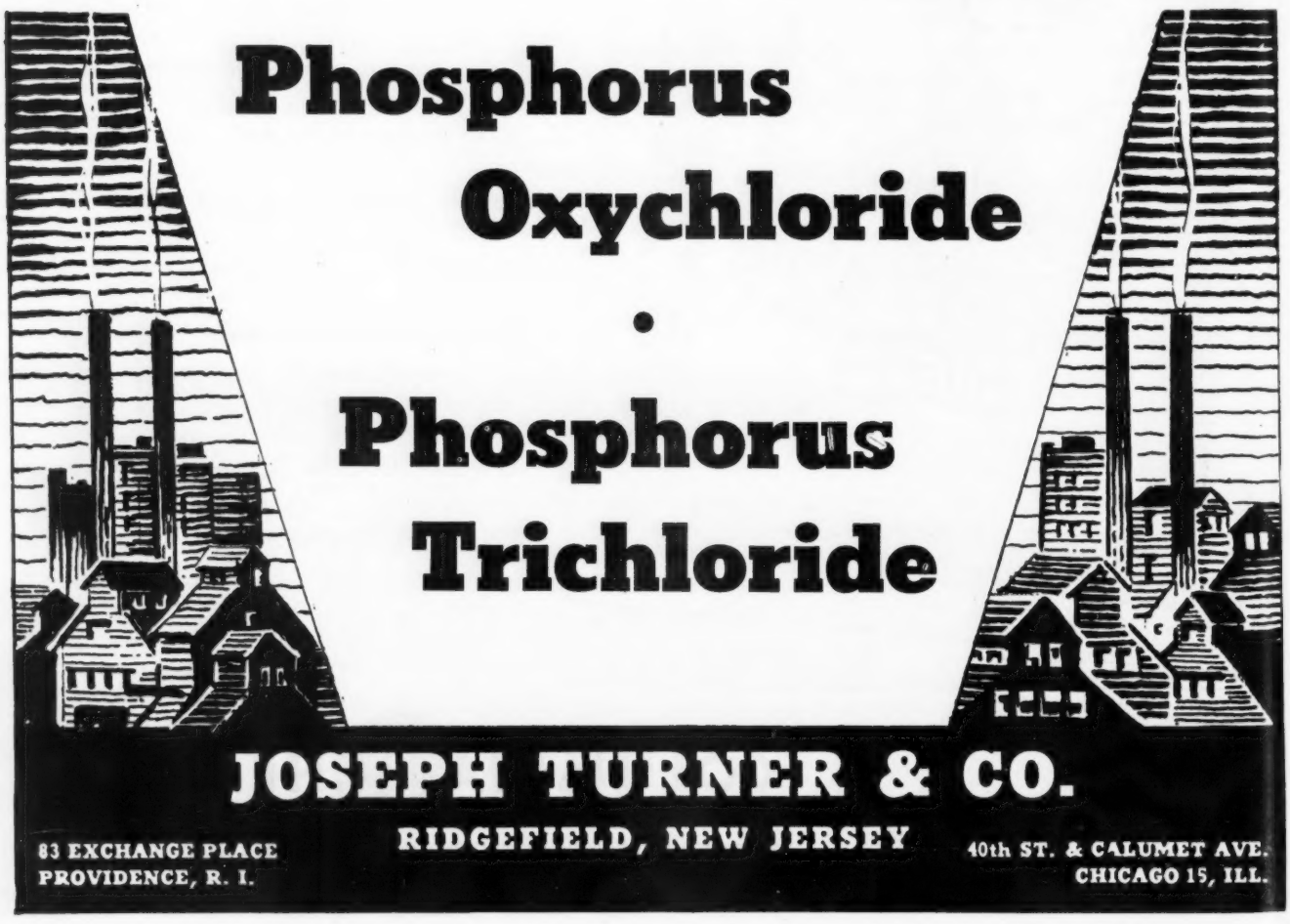
F673. PROCESS CONTROL. The Askania Regulator Co. has issued an illustrated 26-page dictionary of the tentative list of process control terms adopted by the Terminology Committee of A.S.M.E.

F674. PROPORTIONING PUMPS. "Chemical Treatment of Water with Wilson Pulsafeeder Proportioning Pumps" titles a recent 8-page bulletin (No. 242) which is available from the Lapp Process Equipment Division of Lapp Insulator Co., Inc.

F675. PUMPS. McIntyre Controlled Flow Pumps (Series 400) are the subjects of a recent 4-page booklet of the McIntyre Co.

F676. RELIEF VALVE. The Cochrane Multiport relief valve is the subject of a recent 28-page book, available from Cochrane Corp.

F677. STEEL CORROSION. "Corrosion of Steels" titles a new 16-page booklet published by Carnegie-Illinois Steel Corp.



NEWS OF THE MONTH

Private Concerns to Evaluate Synthetic Fuels Processes

BROADENED interest in the potential use of coal as a basis for the production of synthetic liquid fuels can be inferred from the recent disclosure that Pittsburgh Consolidation Coal Co. is planning to join Standard Oil Development Co. in the inauguration of a major privately-financed, research program to investigate the carbonization and complete gasification of coal.

In the proposed merger of research endeavors, Standard Oil Development Co., a subsidiary of Standard Oil Co. (N. J.), will contribute its technical knowledge of petroleum-based processes for the manufacture of high octane fuels. Pittsburgh, with its 43 mines in Pennsylvania, West Virginia, and Kentucky, producing 20 million tons of coal annually, will broaden its own research activities at the company's Disco unit, near Pittsburgh.

Both corporations have long displayed a keen interest in the preparation of liquid aromatic compounds from coal. Standard by its acquisition of U. S. rights to I. G. Farben hydrogenation patents in the '20's, and Pittsburgh by the operation of the only U. S. plant for the low temperature carbonization of coal, by the so-called Disco process. This latter unit has functioned hitherto, however, mainly as a coke producer, and the liquid products—tar acids and creosote—have been sold to disinfectant manufacturers and for wood preservation.

Quite possibly the recent development foreshadows extended investigations into the preparation of high octane fuels by the hydrogenation of low temperature coal tars. Such a project was successfully operated by ICI in England during the war, and although it was originally constructed for coal hydrogenation it was later adapted to a coal tar basis in view of the greater output and ease of operation attainable thereby.

Similar procedures were also employed in Germany, in its 5.5 million ton per annum synthetic liquid fuel program, in competition with the Fischer-Tropsch process, and straight coal hydrogenation.

Ludlow to Manage U. S. I. Sales

Alden R. Ludlow, Jr., with U. S. I. since 1934, has been appointed manager of alcohol and chemical sales by the company. He was recently released from the air corps with the rank of major.

Sawdust Based Alcohol Unit Nears Completion

The Williamette Valley Wood Chemical Co.'s plant, for the production of alcohol from sawdust, is expected to begin operations by June.

With a rated capacity of 5 million gallons of alcohol per annum, construction of the unit was stopped ten days after V-J day, but was resumed on Jan. 2, when the Dept. of Agriculture assumed sponsorship of the project, by negotiating a $450,000 grant from the RFC.

Shell Plans Major Research Investment

Expansion of research laboratories at Emeryville, Calif., involving a capital expenditure of more than $3.5 million, is announced by A. E. Lacomble, president of Shell Development Co., a subsidiary of Shell Oil Corp. Construction will begin this spring and continue over a two-year period.

The project includes construction of three new buildings and extensive remodeling of present facilities. An increase in personnel from about 600 before the war to 1,200 is expected by the time the new building program is completed.

Cyanamid Buys Texas Catalyst Plant

American Cyanamid & Chemical Corp. has completed negotiations with War Assets Corp. for the purchase and peacetime operation of WAC's catalyst manufacturing plant at Fort Worth, Texas.

The Fort Worth unit, for the production of fluid synthetic cracking catalysts, was constructed by Cyanamid under government auspices during the war, to establish the first large scale commercial output of these materials.

The company visualizes a growing market for its products with the development by the petroleum industry of higher grades of gasoline for volume distribution.

Niagara Alkali Promotes Heilborn

Axel Heilborn has been advanced to technical director in charge of research and engineering by Niagara Alkali. Ferri Casciani succeeds Mr. Heilborn as director of research.

International Builds Florida Phosphate Unit

Plans for the development of a new phosphate mine and construction of a plant near Bartow, Fla., are being completed by International Minerals & Chemical Corp. The unit is expected to have an annual capacity of 1 million tons and is scheduled to begin operations by early July.

New Chemical Holds Commercial Promise

Undecylenic acid, which as yet has barely emerged from the pilot plant stage, appears to be one of the newer chemicals which is slated to become a tonnage item in the not distant future. Manufactured from castor oil, the acid and its zinc salt, have attracted attention recently for their fungicidal and insect repellent properties.

In particular, the Navy's Bureau of Medicine has investigated the worth of both the acid and zinc undecylenate as a remedy for athlete's foot in a study involving 5,600 men, and, as a result is reported to have circulated inquiries for 20

ton quantities of the compounding materials. The Navy used two preparations, in powder and ointment form.

The powder composition contained 2 per cent of the acid, and 20 per cent of the zinc salt, in a talc base. The ointment was composed of 5 per cent undecylenic; 18 per cent zinc undecylenate in a wax base with water, propylene glycol, and triethanolamine.

In the medical corps' experiments, athlete's foot developed in 28 per cent of those trainees who received no treatment, but regular dusting with the powder cut infection incidence to 4 per cent. Under the same conditions 15 per cent fell victim to the infection when using the standard boric-salicylic mixture. The ointment cured about 90 per cent of severe foot and groin infections in two to three weeks.

As an insect repellent, a recent patent dedicated to free use by the people of the U. S., claims that a repellent composition containing the acid proved effective against mosquitoes for 2 hours and 38 minutes.

Limit Grain Use For Alcohol Production

The Department of Agriculture has announced an amendment to WFO 141 prohibiting the use of all grain in the production of ethyl and butyl alcohol unless specifically authorized by the Production and Marketing Administration. Since September little grain has been used for industrial alcohol production. However, recent inquiries have indicated that some processors are contemplating a renewal of grain use.

Effective March 1, this provision is the same as that applied to the beverage distilling industry. Officials believe that the restriction of grain use for industrial alcohol is desirable in view of the critical grain shortage and because the large stockpile of industrial alcohol still held by the Reconstruction Finance Corp. is being made available to industrial alcohol processors.

Favor Continued Production of Synthetic Rubbers

Private ownership of the synthetic rubber industry, continued Government allocation and specification control into 1948 and mandatory use of synthetic rubber are proposed as a policy to be pursued by the United States in the postwar period.

Prepared under the chairmanship of William L. Batt, the report was submitted to Reconversion Director John L. Snyder and it calls for the creation by Congress of a new national rubber supervisory body empowered to develop a program to insure "minimum consumption" of general-purpose synthetic rubber.

Security considerations, according to the report, demand that in the future one ton of domestically produced synthetic rubber must be used for every two tons of natural rubber bought overseas.

Synthetic rubber consumption in this over-all proportion should be made mandatory in postwar years if sufficient voluntary uses do not sustain "security" production of some 250,000 long tons per annum.

Containing both short-run and long-run recommendations for United States national rubber policy, the inter-agency report takes a stand for private ownership of the synthetic rubber industry and states that butyl plants, the neoprene plant, the styrene plants and certain specialty chemical plants can be offered for sale now.

But disposal of general purpose synthetic rubber plants, exclusive of the styrene plants, will have to await further study, and will be dealt with in a supplemental report by the committee.

Magnesium Chloride Unit On Auction Block

The Ludington, Mich., magnesium cell feed plant which contributed to the war effort as much as 380,000,000 pounds of magnesium cloride per year is now for sale or lease, the War Assets Corp. has announced.

Operated by the Dow Magnesium Corp., the huge plant was geared for production of 85 per cent magnesium chloride cell feed which was shipped to another Dow-operated plant in Marysville, Mich., where magnesium metal was extracted.

Custodian Seizes German Copyrights

Alien Property Custodian James E. Markham has taken steps to assure American scientists of access to German wartime scientific developments by seizing existing German copyright interests in all German publications issued from 1939 to 1945.

Such action makes possible the publication in the U. S. of German literature of which original copies may not be available, and aims to avoid the situation which obtained after World War I when limited German editions prevented adequate availability of technical data.

License details may be obtained from the Office of the Alien Custodian, Washington 25.

CALENDAR *of* EVENTS

AMERICAN ASSOCIATION OF CEREAL CHEMISTS, annual meeting, General Brock Hotel, Niagara Falls, Canada, May 13-16.
AMERICAN CERAMIC SOCIETY will hold its 48th annual meeting at the Hotel Statler, Buffalo, April 28-May 1.
AMERICAN DRUG MANUFACTURERS ASSOCIATION, spring convention, Cavalier Hotel, Virginia Beach, May 6-9.
AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS will celebrate its 75th anniversary at the Waldorf-Astoria, New York, September 16-18, 1946.
AMERICAN OIL CHEMISTS SOCIETY, 37th annual meeting, Roosevelt Hotel, New Orleans, May 15-17.
AMERICAN SOCIETY FOR TESTING MATERIALS will hold the 49th annual meeting in Buffalo, N. Y., June 24 to 28, 1946.
CANADIAN CHEMICAL CONFERENCE, annual meeting, Royal York Hotel, Toronto, June 24-26.
FLAVORING EXTRACT MANUFACTURERS' ASSOCIATION, annual meeting, Drake Hotel, Chicago, June 2-4.
MID AMERICAN EXPOSITION, Public Hall, Cleveland, Ohio, May 23-June 2.
NATIONAL CHEMICAL EXPOSITION will be held at the Chicago Coliseum, Sept. 10-14.
NATIONAL INSTRUMENTATION CONFERENCE and Exhibit, Hotel Wm. Penn, Pittsburgh, Sept. 16th-20th.
NATIONAL PLASTICS EXPOSITION, Grand Central Palace, New York, April 22-27.
PRODUCTS OF TOMORROW EXPOSITION will be held at the Coliseum in Chicago, April 27-May 19, 1946.

Merge Seven Wood Chemical Concerns

The wood chemical and charcoal industry of Northern Pennsylvania, which supplies 80 per cent of the demand for such chemicals in the northeastern states, is being reorganized and revitalized by the recently formed Susquehanna Chemical Corp, capitalized at $1.5 million, and headed by Phillip C. Crowen. The company, which has offices in the Empire State Bldg. and operating headquarters at Bradford, Penn., has purchased seven

Head Newly Formed Susquehanna Chemical

Phillip C. Crowen (left) and Stephen P. Kelly, hold the posts of president and executive vice-president, respectively, of the recently organized Susquehanna Chemical Co. Mr. Crowen is a former vice-president of Pepsi-Cola and Mr. Kelly was secretary of William S. Gray & Co.

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Caroxite is supplied in two ranges of particle size. The 8-20 mesh is generally preferred for steel analysis while the finer 20-30 mesh is preferred for micro determinations.

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Headquarters for Laboratory Supplies

wood chemical companies with eleven plants in the Bradford area. By improving existing facilities, and eliminating duplication of production, the organization hopes to revive what has been a languishing industry, and realize a $7 million per annum sales volume.

The seven companies merged by Susquehanna are: Clawson Chemical Division, Hallton; Custer City Chemical, Custer City; Crosby Chemical, Crosby; Genesee Chemical, Roulette; Norwich Refinery, Smethport; and Union Charcoal, Westline.

No radical changes in the operating personnel and policies of the individual plants will be made, according to Mr. Crowen, and the three railroads formerly owned by the companies will function as heretofore, under Susquehanna supervision.

Apart from Mr. Crowen, other executives of the new organization are: David Reimer, Philadelphia, chairman of the board; and Stephen P. Kelly, executive vice-president (formerly secretary of William S. Gray & Co.).

Develop New Fuel Evaluation Scale

New and reliable methods for evaluating motor fuels, to replace the current inadequate octane number and other scales, are in the course of development, according to Donald D. Brooks, National Bureau of Standards.

Speaking before the Society of Automotive Engineers in Chicago, Mr. Brooks pointed out that the Coordinating Research Council regards the leaded triptane-heptane scale, which is expressible either as a triptane number or detonation index, as extensible with accuracy to the upper limit of anti-knock quality, and particularly applicable to the evaluation and comparison of aviation fuels.

Experimental work now in progress is expected to provide an adequate basis for appraising the relative merits of both present and proposed scales.

Clinical Study of Streptomycin Funded

Grants-in-aid for clinical study of streptomycin amounting to more than $500,000, contributed in equal shares to the National Research Council by eleven pharmaceutical manufacturers constituting the Streptomycin Producers Advisory Committee of the C. P. A., have been announced by Roy S. Koch, of the Chemical Division of CPA.

The grants-in-aid are to finance a program for the clinical evaluation of streptomycin in infectious diseases by the committee on chemotherapeutics and other agents of the National Research Council.

Streptomycin production has increased from approximately 3,000 grams last September, CPA said, to approximately 27,000 grams expected in March, 1946. This is equivalent to 27,000 vials of 1,000,000 units each.

Named to CI Editorial Staff

W. Alec Jordan has joined Chemical Industries as news editor. During the ten years since his graduation from McMaster University and completion of special studies at McGill, Mr. Jordan has acquired broad practical experience in product and process research and development, chemical economics, and marketing through his association with Norton Co., General Motors, and Apco Industries.

Patents Released for Public Use

Twelve patents owned by Walter Kidde & Co., Inc., of Belleville, N. J., and Hercules Powder Co. of Wilmington, have been dedicated to the United States public for free use and will be listed on the Register of Patents Available for Licensing which is maintained by the Patent Office, the Department of Commerce announces.

Included in the Kidde patents is one designed to improve the means of storing explosives or dangerous fluids, one giving a method for producing inert gases, and another giving a method for protecting combustibles, particularly applicable to tankers transporting oil, petroleum or gasoline.

The Hercules patents relate to improvements in varnishes and lacquers and the production of a rosin base ester-drying oil composition, which might be used in place of tung oil.

New Sulfuric Unit for Midwest

The newly-formed Marion Manufacturing Co., Indianapolis, plans the immediate construction of a $500,000 sulfuric acid plant, according to R. D. Martenet, vice-president.

The unit will be built adjacent to the Union Stock Yards and most of its output will be channelled to nearby fertilizer manufacturers. Production, estimated at 50,000 tons of acid annually, is scheduled for Dec. 1.

Other officers of the Marion organization are: John E. Powell, president, and Howard F. Kimball, treasurer.

India Plans Chemical Industry Expansion

The chemical manufacturing industry of India is searching out ways and means for the further exploitation of the country's raw materials. This broad development is expected to be accomplished by a threefold plan which will include increasing the diversity of products, improving standards of items through the application to manufacturing processes of recent technical advances in the United States and elsewhere, and expanding production capacity.

It is proposed to branch out into making all types of products, the raw materials for which are available in the country. Chromium, copper, mica, and bauxite are a few such raw materials which India has in abundance.

The chemical industry of India hopes

Chemical Company Earnings Reports Summarized

Company	Period	Sales 1945-44	Net Profit 1945-44
Atlas Powder Co.	Year to Dec. 31	$44,380,947– $45,024,002	$1,415,178– $1,699,917
Commercial Solvents Co.	Year to Dec. 31	$40,284,861– $44,437,271	$2,133,418– $2,521,130
E. I. du Pont de Nemours & Co.	Year to Dec. 31	$611,256,225–$622,062,712	$77,521,007–$80,870,106
Freeport Sulphur Co.	Year to Dec. 31	$20,939,834– $18,004,451	$3,349,790– $2,558,709
Hercules Powder Co.	Year to Dec. 31	$100,555,904–$105,677,952	$4,925,000– $4,825,855
Hooker Electrochemical Co.	Year to Nov. 30	$19,075,396– $18,434,910	$1,078,286– $1,264,264
Mathieson Alkali Works, Inc.	Year to Dec. 31	$19,590,256– $18,379,926	$1,148,631– $1,322,822
Monsanto Chemical Co.	Year to Dec. 31	$95,339,391– $87,953,659	$5,318,003– $4,869,906
Victor Chemical Works	Year to Dec. 31	$16,547,880– $14,934,280	$1,128,264– $1,056,624

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to find methods for co-operation and collaboration with United States manufacturers. One such method of collaboration might take the form of establishing branch factories in India of United States chemical firms. Such branch establishments would be feasible for manufacturing products from raw materials which are available on the spot in India. This collaboration would obviate the necessity of such United States chemical companies exporting finished products to India.

Neal Returns to Phillips Petroleum

Hugh A. Neal, ex-Lt.-Col. with the paratroops, has rejoined Phillips Petroleum Co. as assistant manager Perco Division, Chemical Products Dept., Bartlesville, Okla. Mr. Neal has been in active army service since 1940.

Explore Industrial Potentialities of Iodine

An extensive program of research to "industrialize" the chemical element iodine is now in progress in the laboratories of Battelle Memorial Institute, Columbus, Ohio.

Sponsored by the Iodine Educational Bureau, Inc., New York City, the research has as its objective the uncovering of those properties of iodine and its compounds which will make the element more useful industrially.

As explained by Battelle scientists, iodine has in general been neglected by industrial science. Although widely known for its uses in medicine, nutrition, photography, as a constituent of several important organic compounds, and as a laboratory reagent, its potential industrial applications have never been fully explored. Yet, it and its compounds have unique properties which may possibly serve as building stones for the creation of new industrial products.

A number of previously suggested possibilities for iodine will be investigated in the research program. In addition, exploratory work will be conducted in the making of new iodine compounds and in determining their useful properties.

OPB Reports Available

The fourth issue of the "Bibliography of Scientific and Industrial Reports Distributed by the Office of the Publication Board" containing abstracts of 473 reports has been released recently by the Superintendent of Documents, Government Printing Office.

The bibliography, issued in weekly installments, contains the serial numbers, prices, and titles of reports obtainable from OPB, indexed according to subject matter and including a brief summary of the contents of each report.

Described in the report are scientific and technical developments, processes, products, and inventions previously subject to security restrictions. The fourth issue is priced at 20 cents.

WAC To Sell Insect Repellent

More than 75,000,000 bottles of insect repellent, prepared for shipment to military forces overseas, has been declared surplus by the Army and is available to purchasers, it is announced by the War Assets Corp.

Acquired by the Government at a cost of more than $6,000,000 it is reserved for priority claimants, including veterans, for fifteen days, after which time it will be released to wholesalers, retailers and exporters in the drug market.

The repellent is packaged in 2-oz. bottles. It has been given an OPA ceiling resale price of 25c per bottle.

Invite Fellowship Applications

Applications for the duPont postgraduate fellowship in chemistry awarded to the Polytechnic Institute of Brooklyn for the 1946-47 academic year will be accepted up to the first of June, it is announced by Raymond E. Kirk, dean of the Graduate School and head of the Department of Chemistry.

This second postgraduate fellowship in chemistry offered through the Polytechnic Institute provides tuition plus a $1,200 stipend for a single person or $1,800 for a married person.

New Elastomers Developed at Illinois

Fifty new kinds of synthetic rubber were developed at the University of Illinois research laboratories during the past three years, according to an announcement made by Professor Carl S. Marvel.

The research activities, which have been conducted under sponsorship of the Office of Rubber Reserve, will be continued for another year.

View Citrus Leaves as Vitamin Source

In search of a non-edible source of vitamin C, Russian scientists have conducted experiments to determine the vitamin content of leaves from citrus fruit trees.

Of those examined, the leaves of orange and lemon trees showed the highest content of vitamin C at 880 mg. per cent; tangerines the lowest, with 235 mg. per cent.

Recommendations have been made to organize vitamin production from such foliage in the citrus groves of Abkhazia.

COMPANIES

Alkyd Resin Unit for California

Ground is now being broken for the construction of a glyptal alkyd resin plant at Anaheim, California, to be used by the General Electric Company in the manufacture of alkyd resins for paint bases.

The plant was designed and is being constructed by the Chemical Plants Division of Blaw-Knox Company, Pittsburgh, Pennsylvania, at a cost exceeding $500,000, and is scheduled for completion this fall.

Directs Goodrich Chemical Production

W. W. Scull has been named production manager of plants by B. F. Goodrich Chemical Co. Mr. Scull was formerly plant manager for the Louisville and Port Neches government synthetic units operated by Goodrich, and was chairman of the purchasing committee for building war-created synthetics plants.

Allied Chemical Plans Expansion

Allied Chemical and Dye Corp. plans substantial expansions over the next few years with the construction of additional facilities to increase capacity for making nitrogen products, acids, alkalies, and synthetic detergents according to President H. F. Atherton.

Allied sales, in the first half of 1945 set a record high, Mr. Atherton states, but third quarter cancellation of war contracts

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DETROIT
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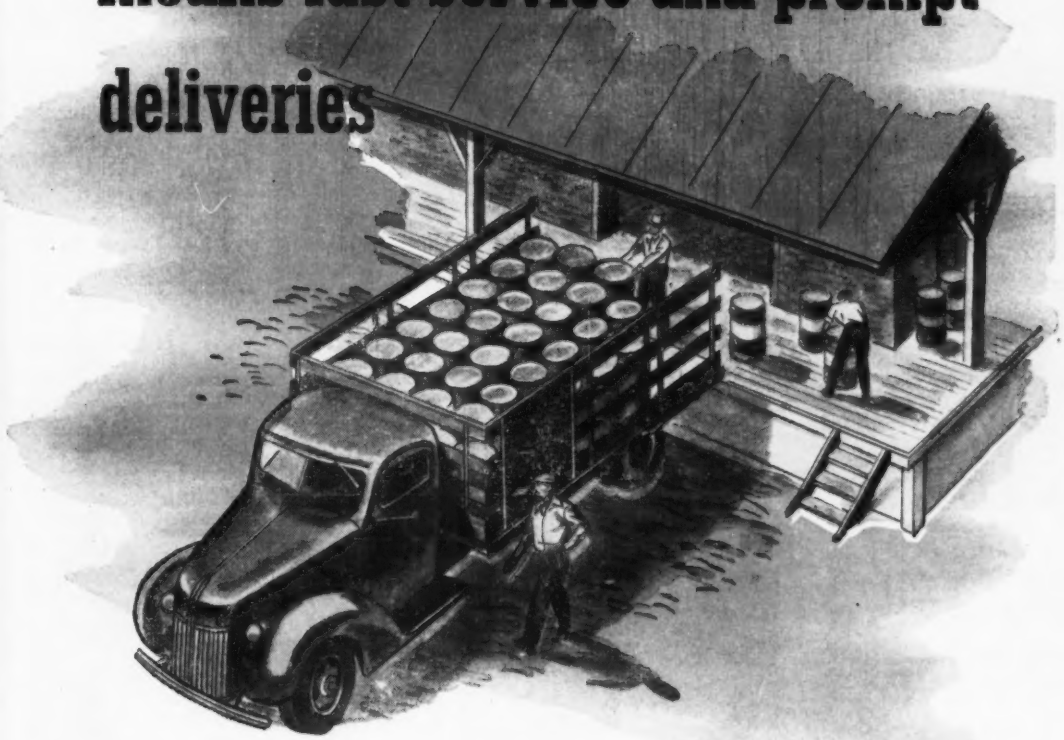

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SYNTHETIC ORGANIC CHEMICALS

resulted in volume for the year slipping to $267 million compared with 1944's $274 million. Net profit, however, stood at $18.9 million, up $900,000 over the preceding year.

Enlarge Foamglas Production Unit

The Pittsburgh Corning Corp. has announced plans for a $300,000 expansion of existing facilities for the manufacture of Foamglas, a glass insulation material, at its Port Alleghany, Pa., plant.

New Plastics Plant for G. E.

General Electric Co. has announced plans for the construction of a $2 million plant at Wallingford, Conn., to manufacture plastic molded parts.

The new project will replace the company's present unit at Meridon, according to James D. Milne, plant manager, with completion scheduled for late this year.

Freeport Sulphur Sales at New High

Sulphur production and sales of Freeport Sulphur Company in 1945 were the greatest in the company's history and sales since the end of the war "have been well maintained," Langbourne M. Williams, Jr., president, announced in the annual report.

Net income for the year 1945 after all charges, including depreciation, depletion, taxes, and special reserves, amounted to $3,349,790, or $4.19 per share on the 800,000 shares of common stock as compared with $2,558,709, or $3.20 per share in 1944. These figures include $447,722 in 1945 and $351,121 in 1944, as the company's portion of the net income of Cuban-American Manganese Corporation.

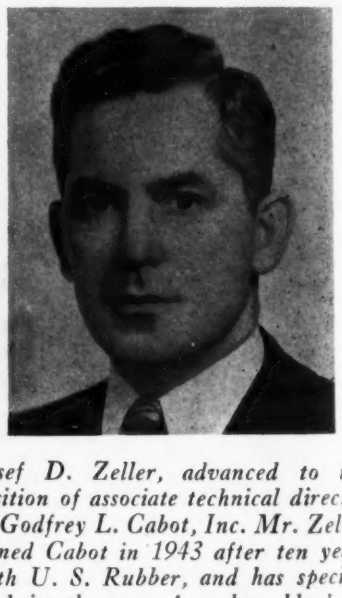
Current assets on December 31, 1945 amounted to $23,719,293 of which $16,790,839 was cash and government bonds, and current liabilities amounted to $5,588,985. As of December 31, 1944 current assets amounted to $20,936,712 of which $12,483,243 was cash and government bonds and current liabilities amounted to $4,751,326.

Goodrich Doubles Polyvinyl Output

An expansion program to more than double manufacturing facilities for Geon polyvinyl resins has been announced by B. F. Goodrich Chemical Co., Cleveland.

A portion of the new output is expected to be available this summer, with full production scheduled for early in 1947.

Cabot Promotes Zeller

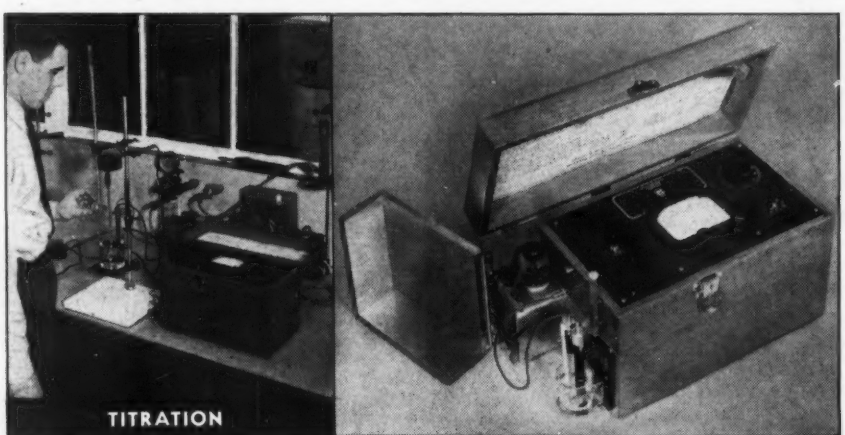


Josef D. Zeller, advanced to the position of associate technical director of Godfrey L. Cabot, Inc. Mr. Zeller joined Cabot in 1943 after ten years with U. S. Rubber, and has specialized in the use of carbon black in rubber compounding.

Monsanto Growth Noted by Queeny

The Monsanto Chemical Co. has invested $29,000,000 in new manufacturing facilities from 1941 through 1945, it was disclosed by Edgar M. Queeny, chairman of the board of directors, in connection with the announcement of a plan for financing the company's expansion program and for providing additional working capital.

Physical assets of the company including land, buildings, machinery and equipment and phosphate deposits, stood at $70,155,045 at the year's end, according to the company's recent annual report. This



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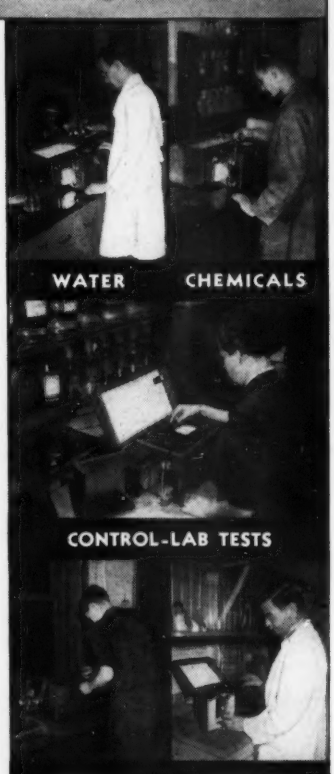
Solution to be checked can be at any temperature to 50 C (120 F); can be a thick solution or often a soft solid as well as a thin liquid.

Complete with supplies and directions, this Indicator is reasonably priced for quality at $160.00.



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was an increase of $2,720,676 over the total reported as of Dec. 3, 1944.

Hatch Joins Bristol Laboratories

Alden B. Hatch has joined Bristol Laboratories, Syracuse, to direct fermentation process research. Dr. Hatch was formerly in charge of fermentation production at Cutter Laboratories, Calif., and served as technical consultant to Abbott Laboratories.

Ben Venue To Buy WAC Penicillin Unit

The penicillin plant at 270 Northfield road, Bedford, Ohio, together with machinery and equipment, will be sold to the Ben Venue Laboratory, Inc., wartime operators, for $150,000, subject to the priority rights of Federal government agencies, the War Assets Corporation has announced.

The purchaser plans to use the plant for manufacture of hormones, antibotic, and other biological products.

Alcoa Purchases Alaskan Deposits

Alcoa Mining Co., a subsidiary of Aluminum Co. of America, has purchased calcium carbonate deposits on Kosciusko Island, off Ketchikan, Alaska. This follows an announcement several weeks ago that the company had discovered valuable laterite deposits in Oregon, which contain a high percentage of alumina. Lime would be used in its processing.

While the company's statement did not so specify, it is probable that laterite reduction units may be built in the Portland area, with alumina going to Alcoa's nearby plant.

Penn Salt Seeks Export Market

George B. Beitzel, vice president in charge of sales of the Pennsylvania Salt Manufacturing Company, said recently that Pennsalt will increase its exports to Latin-America fifty to one-hundred per cent on various products during 1946.

Mr. Beitzel is making a four-week tour of Cuba, Brazil, Argentina, Chile, Peru and Panama and states that the company may eventually erect production units in South America.

American Zirconium Plant Destroyed by Fire

The plant of American Zirconium Corp., St. Helena, Md., chemical and pigment division of the Glidden Co., was destroyed by fire last month. Damage was placed at $1,100,000.

Heyden Acquires Control of Plastics Company

B. R. Armour, president of the Heyden Chemical Corp, New York, has announced that the company has acquired the stock interest of S. Karpen & Bros., in the American Plastics Corp., and now holds about two-thirds of the outstanding shares.

New Consulting Concern Headed by Esselen

American Development & Engineering Corp. has been formed recently with head offices at 857 Boylston St., Boston, to design and supervise construction and operation of plants for the production of rayon, purified cellulose, or cellulose products. The corporation will also function in a similar capacity in connection with textile units based on either naturel or synthetic fibers.

Officials of the new organization are:

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Ammonium Thiosulfate, Crystals & 60% solution
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Benzotriazole
(restrainer in photography)

o-Phenylenediamine
(photo developer)

Sodium Cyanate
(synthesis, metal hardening)

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JAPAN WAX (Special)
CANDELILLA WAX

Gustavus J. Esselen; Martin H. Gurley, Jr.; Richard M. Nichols; Robert R. Duncan; and John G. Hildebrand, Jr.

Solvay Opens New Southwestern Branch

Solvay Sales Corp. has announced the establishment of a new office at No. 847 M & M Building, Houston, Texas. This new office, which will cover the states of Texas, New Mexico and Arizona, will be in charge of S. O. Taylor.

Solvay Sales Corp. markets alkalies, calcium chloride and other chemical products manufactured by The Solvay Process Co.

Fisher Scientific Expands

Fisher Scientific Co. is constructing a six story addition to its Pittsburgh facilities to permit expansion of its instrument shops, development laboratories, and order filling departments.

Although the plant addition will double the total floor space available it will triple present manufacturing facilities.

Glyco Opens Chicago Office

Glyco Products Co., Inc., has announced the opening of its new Chicago sales offices at 30 North Dearborn Street, Chicago 2, Ill., under the supervision of George H. Goodyear.

Thompson Joins Heyden

DeWitt Thompson, formerly with Mathieson Alkali and recently commander in the U. S. Navy, has joined Heyden Chemical Corp. He is past president of the Salesmen's Association of the American Chemical Industry.

American Anode Plans Western Unit

American Anode, Inc., of Akron, Ohio, will construct a manufacturing and processing plant in Los Angeles, Calif., it is announced by B. F. Stauffer, Anode president. The new plant, to be erected as rapidly as possible, is expected to be in operation late this year.

In full production the new plant will produce approximately 4,000,000 pounds of finished latex compounds annually with plans calling for expansion as required. A complete testing laboratory will be included in the new unit to assist users with manufacturing problems and in the development of new uses for latex.

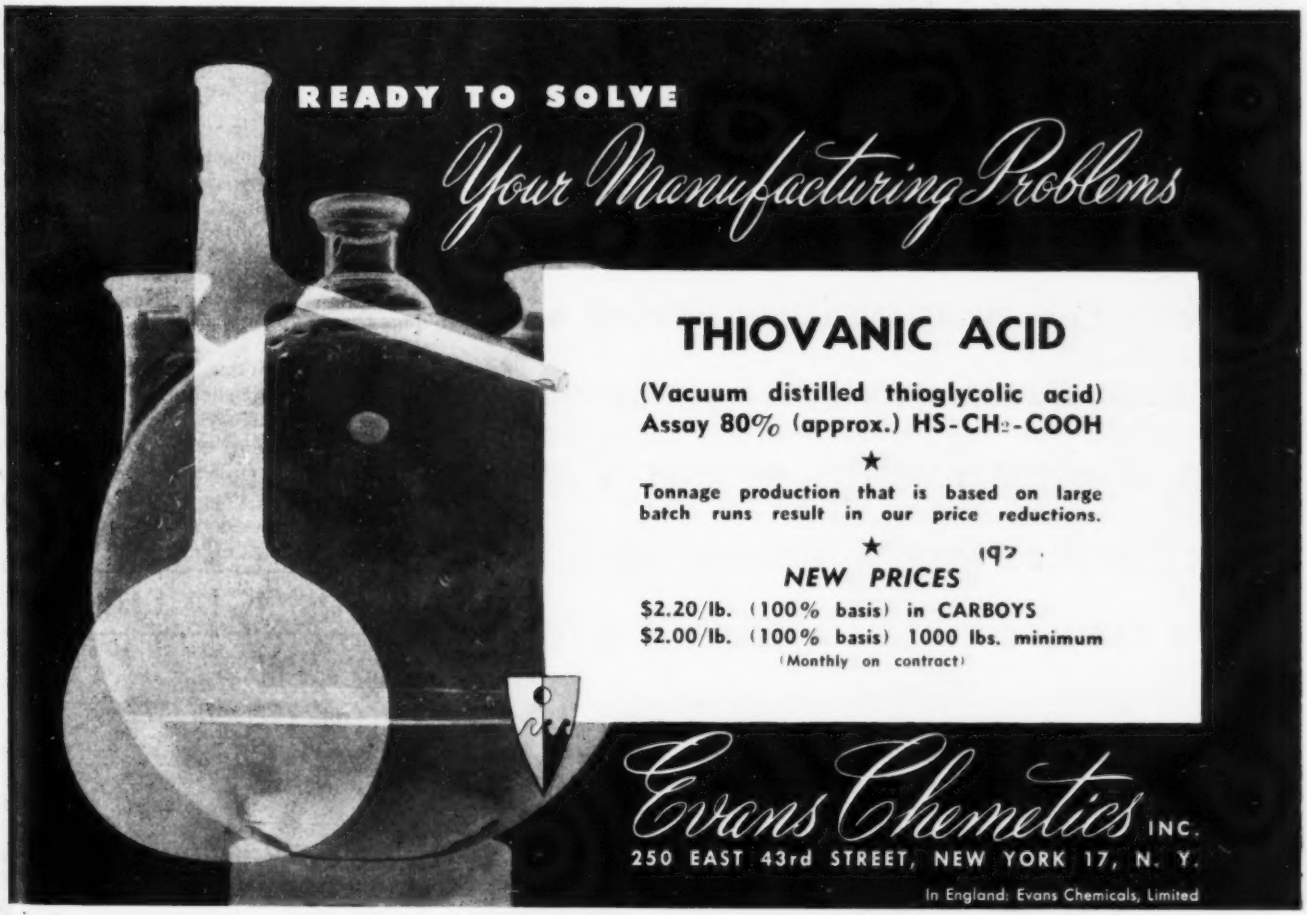
Standard Chemical Opens Trenton Branch

C. J. Harwick, president of Standard Chemical Co., Akron, Ohio, has announced the opening of a new branch office in Trenton, N. J., with complete warehouse facilities for serving the middle-Atlantic States area.

The new branch offices are located in the Broad Street Bank Building in Trenton and are under the management of M. E. Davis, who was formerly with J. M. Huber, Inc., New York.

Baker Plans Major Expansion

J. T. Baker Chemical Co., Phillipsburg, N. J., is completing plans for a $3 million expansion program. Main features of the project, are the extension of organic laboratory facilities, construction of a new pilot plant, and increasing the productive capacity of the reagents and agricultural chemicals division.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FACTORIES AT CLIFTON, N. J. AND SEILLANS (VAR) FRANCE

WRITE FOR DETAILS

The company has recently completed a unit for the preparation of penicillin with initial production realized early this month.

Bacon Laboratories Expands

Frederick S. Bacon and Philip D. Wilkinson have formed a partnership under the name of Frederick S. Bacon Laboratories.

The new firm will continue the chemical research and consultation business established in 1939 at the present location, 192 Pleasant St., Watertown, Mass.

Blaw-Knox Net Earnings Up

Net income of the Blaw-Knox Co. last year amounted to $3,344,288, equal to $2.51 a share on 1,334,458 common shares outstanding, compared with $2,169,417, or $1.63 a share in 1944, the annual report to stockholders revealed.

Net working capital at the year-end was $13,998,678, an increase of $3,400,127 since Dec. 31, 1944. The report also noted that production by the company during hostilities reached a total of $430,000,000.

Fisher Chemical Appointed Inorganics Agent

Inorganics, Inc., Knoxville, Tenn., formerly engaged in the manufacture of peroxides for the Government during the war, has appointed Fisher Chemical Co., New York, as sole U. S. agents for the sale of its benzoyl peroxide.

Company Notes

WOBURN CHEMICAL CORP., Harrison, N. J., has appointed the Raw Materials Co., Boston its representative for the New England territory.

CHEMICAL SALES INC., distributors of the Diamond Alkali Co., has opened offices and warehouses at 500 East Markham St., Little Rock, Arkansas.

WELCH, HOLME & CLARK CO., INC., have been appointed agents of the Midwest Extraction Co., Rockford, Illinois, and will handle the distribution of the principal's chlorophyll, carotene, xanthophyll and preophytin in New York City and the northeastern seaboard.

ASSOCIATIONS

Chemical Market Researchers to Meet

The Chemical Market Research Association will hold its fourth regular meeting at the Hotel Statler, Detroit, on April 25th.

The theme of the meeting will be "Techniques of Market Research," with Lawrence G. Lockley, du Pont; John S.

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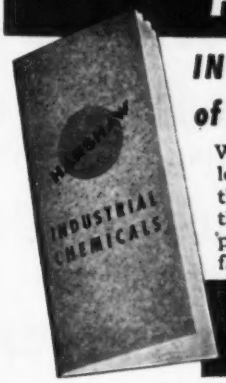

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Safety Heaters

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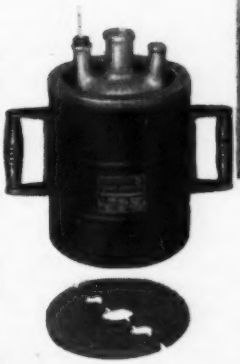
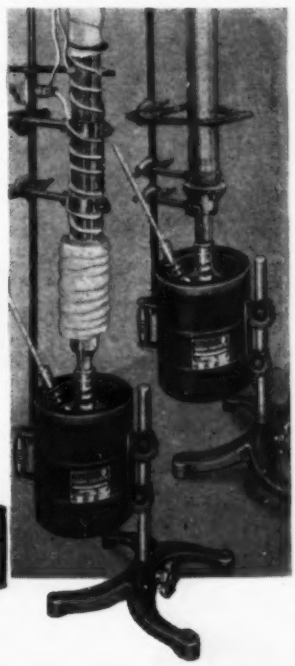
FEATURES

Hemispherical seamless steel bowl shaped to fit flask. Heating elements fully enclosed. Gear rack elevating support available for unusually heavy or complex setups allows elevating and lowering of Safety Heater without disturbing glassware setup. Special transite covers when required. Available in six sizes, ½, 1, 2, 3, 5 and 12 liter capacity.





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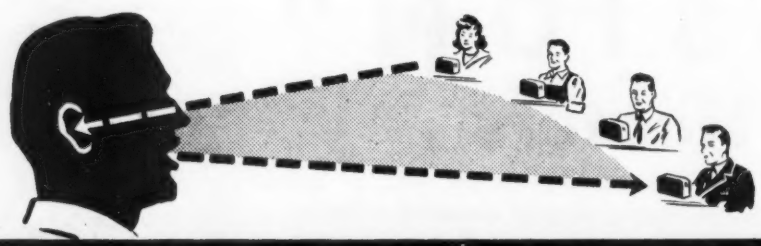

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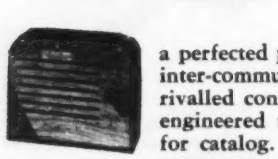

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Spurr, McGraw-Hill; H. C. Knepper, Owens-Illinois Glass; and Wroe Alderson, contributing papers on various phases of the subject.

AIChE Plans Western Meeting

The recently organized Northern California Chapter of the American Institute of Chemical Engineers,—second chapter of this engineering society west of the Rockies—is now making plans for a regional meeting to be held in San Jose, near San Francisco, early this autumn. This will be the first AIChE convention in the west since 1924 and the first in California since 1915. The theme of the convention will be "New Western Industries" and a special effort will be made to acquaint eastern chemical engineers with the new chemical, petroleum and other process industries of the entire west.

Although less than two years old, the Northern California chapter last year took first place among all the twenty-one local Institute sections in having the highest ratio of attendance to total membership. In average meeting attendance, it was topped only by the metropolitan New York chapter.

Recently elected chairman of the Northern California chapter is A. George Stern of Westvaco Chlorine Products Co., Newark, Calif., who succeeds C. R. Nelson of Shell Development Co. Other new officers are John R. Callaham, Chemical & Metallurgical Engineering, San Francisco, as vice-chairman and Jose A. Samaniego, Shell Development Co., San Francisco, as secretary-treasurer.

Production Managers to Review Policies, Methods

A three-day conference in April to provide approximately 1,500 production managers from all types of industry in the United States an opportunity to exchange information and experience on common problems is planned by the American Management Association.

The meeting will be held in New York City, April 22, 23 and 24 at the Hotel Pennsylvania and will be open to members and non-members of the Association.

Druggists' Association Meeting

Plans for reducing the public's bill for health services by cutting the costs of drug distribution will be discussed at a special mid-year meeting of the National Wholesale Druggists' Association at the Palmer House in Chicago on April 17 and 18, it is announced by Al B. Benson, of Boston, president of the association. An attendance of more than 500 is expected.

This will be the association's first mid-year meeting since 1944 and the first meeting of the full membership in 18 months. Because of wartime travel re-

Soluble 2,4-D

Costs Less to Formulate

RECENTLY THE J. T. BAKER CHEMICAL CO. offered to the manufacturers of weed killers 2,4-D itself, and the sodium salt of 2,4-D. Because the sodium salt is soluble in water it costs less to formulate. This product is a chemical compound and not a mixture. There have been so many requests for further information, that we take this method of presenting some of the facts pertaining to this product.

GENERAL

The chemical 2,4-D is 2,4-dichlorophenoxyacetic acid. It is a white powder of limited solubility in water. Since the acid form is not very soluble in water, it must first be dissolved in a "Carrier." A 10% to 15% solution of 2,4-D in a carrier is first prepared (temperatures above 125°F.), and this concentrate is dissolved in warm water to give a spray solution of the desired concentration. The acid can also be dissolved in water by adding 20-30% sodium carbonate. This apparently converts the acid form to the more soluble salt.

The sodium salt of 2,4-D, as supplied by Baker, is the monohydrate. It is also a white powder, and like the acid is a non-corrosive, non-inflammable material. It differs from the acid form of 2,4-D in that it is soluble in water. A 4% solution of the 2,4-D salt in water can be prepared at room temperature. A spray solution containing 0.1% 2,4-D can be easily prepared by dissolving 1 pound of sodium salt in 100 gallons of water directly, *no carrier being necessary.* A wetting agent can be incorporated either with the dry powder, or added to the final spray solution.

METHOD OF APPLICATION

2,4-D is usually applied in an aqueous solution containing 0.1% 2,4-D. It is applied at the rate of 4-5 gallons per 1000 square feet on lawns, and 6-7 gallons per 1000 square feet (300 gallons per acre) on larger plants and in fields.

Recently, work has been done applying 2,4-D as a dust, using various carriers. The rate of application was 4 lbs. of dust per 1000 square feet. The use of dust does not appear to be a very economical way of applying 2,4-D. Furthermore, in using dusts there is danger of the destruction of desirable plants by the drifting of dust particles.

FORMULATION OF 2,4-D

With the production of the soluble salts of 2,4-D, such as the sodium salt produced by Baker, the use of a carrier is no longer necessary. The salt can be dissolved directly in water (1 pound in 100 gallons of water) and a wetting agent added to the solution. It would also be possible to incorporate a solid wetting agent with the dry powder for small sales. Recently Marth and Davis of the Bureau of Plant Industry, U. S. Dept. of Agriculture, carried out some work comparing the action of the acid form of 2,4-D (in a carrier) with the sodium salt. In all their tests the ***sodium salt dissolved in water containing a little laundry soap was about as effective as the expensive acid-carrier formulation.*** Other wetting agents have been found very satisfactory. It is necessary to use a good wetting agent and spreader on plants having waxy foliage.

WHERE CAN 2,4-D BE USED?

A great deal of work is being carried on all over the country to evaluate properly the position of 2,4-D as a weed killer. The present status is best judged by the reports given at the recent meeting of the North Central States Weed Control Committee in St. Paul at which results of the field tests carried out last summer were reported. The Committee definitely went on record as approving the use of 2,4-D against lawn and turf weeds.

Ragweed can be effectively controlled by 2,4-D. Even if the plant is not killed, the application of 2,4-D to the budding plant prevents the opening of flowers and the spreading of pollen. The results with poison ivy are still not conclusive.

The following general information is extracted from a Bureau of Plant Industry release dated July, 1945.

WHAT WEEDS WILL 2,4-D KILL?

A solution of 2,4-D containing as little as 1⅓ ounces of the chemical in 10 gallons of water (1/10 of 1 percent by weight) when used as a sptay is deadly to many species of broad-leaved plants. Some species upon which this substance has been effective are—

Dandelion	Daisy	Pigweed
Narrow-leaf plantain	Heal-all	Three-seeded mercury
Lawn pennywort	Chickweed	Burdock
Broad-leaf plantain	Winter cress	Wild Mustard
Japanese honeysuckle	Pokeweed	Frenchweed
False strawberry	Curled dock	Wild lettuce
Annual morning-glory	Ragweed	Annual sow thistle

WHAT WILL 2,4-D DO TO GRASSES?

So far 2,4-D has not been found effective on crabgrass, quackgrass, Johnson grass, nutgrass, or other weedy grasses and sedges. It does affect bent grass and anyone with a bent grass lawn should be cautious about this new treatment. A good point about the 2,4-D spray is that it does not hurt Kentucky bluegrass, annual bluegrass, redtop, fescue, and buffalo grass. It *will* kill or seriously retard the growth of White Dutch clover.

WHEN IS 2,4-D USED?

Usually the best time to use 2,4-D sprays on lawns or other turf is in late spring or early fall, when the weather favors the growth of grass, rather than in extremely cold or hot, dry periods. The best time to use 2,4-D on farm weeds has not yet been determined. Lawns effectively treated with the 2,4-D carrier mixture will be free of dandelions and plantains for 2 to 3 months. Later it may be necessary to re-treat the area to kill seedling plants that have grown since the first spraying.

TEST SAMPLES AND GENERAL BULLETIN AVAILABLE

For those companies who plan to formulate 2,4-D or the sodium salt of 2,4-D, Baker will gladly supply test samples. The advice and counsel of our organic chemical research staff is also available. Please address your communications to the Organic Chemistry Division, J. T. Baker Chemical Co., *Executive Office,* Phillipsburg, N. J.

Baker's Chemicals

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Furfural PHYSICALLY and CHEMICALLY has PROPERTIES VALUABLE To You

FURFURAL, the cheapest pure aldehyde available today, does duty for the chemist on two counts—its physical properties and its chemical properties.

PHYSICALLY...

Because of its selective solvent properties, its preferential solubility for unsaturated compounds, Furfural is widely used to refine organic crudes with components of varying degrees of unsaturation. In the refining of lubricating oil, in the separation and purification of butadiene, in the manufacture of pale rosins from crude dark colored rosin, in the separation of fractions of high-iodine number from animal and vegetable glyceride oils, Furfural is especially effective and economical.

Other uses for Furfural, continually gaining in importance, are as a dispersant in resinoid-bonded abrasive wheels, dyes, lacquers, and varnish removers.

CHEMICALLY...

Its versatility as an aldehyde in condensation, oxidation and reduction makes it a useful raw material in organic syntheses.

PHYSICO-CHEMICALLY...

In the manufacture of phenolic resins, Furfural is being used because of its high boiling point, its high molecular weight, and the unique properties of its heterocyclic ring structure. Valuable in this connection too are its solvent properties. Ability to dissolve phenolic bodies and resinous condensation products makes it possible to maintain substantially homogeneous mixtures throughout the reaction process.

***Furfural* SUPPLY IS PLENTIFUL**

The supply of Furfural is ample to meet all present and anticipated needs and a program to keep production facilities ahead of increasing demands is already in operation.

LITERATURE AVAILABLE ON *Furfural*...

PROPERTIES OF QUAKER FURFURAL

(Furfuraldehyde, C_4H_3O-CHO)

Amber-colored liquid of high stability and unusual purity

Molecular Weight	96.08
Freezing Point, °C	−37
Boiling Range (99%)°C	157 to 167
Specific Gravity (20/20°C)	1.161
Flash Point (open cup)°C	56
Refractive Index (20/D)	1.5261
Surface Tension at 20°C (dynes/cm)	49
Viscosity at 38°C (centipoises)	1.35

Solubility: Completely miscible with ethyl alcohol, ether, acetone, benzol, butyl acetate, china wood oil and most organic solvents except petroleum hydrocarbons and glycerol; 8.13% by wt. in water at 20°C.

Analysis

Furfural, minimum %	*99.5
Water, maximum %	0.2
Organic Acidity, Maximum equiv/1	0.023
Ash, maximum %	0.006
Mineral Acidity	None
Sulfates	None
Ketones	None

*As determined by A.O.A.C. method.

Standard Containers: 9, 45, 90, and 520 lb. Drums

†Carload of Drums 80 to 88	41,600 to 45,760 lbs.
Tank Car 8,000 gal	78,000 lbs.
Tank Car, 10,000 gal.	98,000 lbs.

†ODT requires maximum loading

Drums non-returnable

Three Bulletins in a series on the Furans being published by the Quaker Oats Co. Chemicals Dept. are now available to those interested. They are:

Bulletin 201—*General Information About Furfural.*

Bulletin 202—*Introduction to the Chemistry of the Furans.*

Bulletin 203—*Physical Data on Furfural.*

Any one of these or all will be sent free of charge when requested on your letterhead. Samples will be gladly furnished to those who would like to work with Furfural and the Quaker Oats Technical Staff is ready to help in the application of Furfural to your problems.

The Quaker Oats Company

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strictions, the 1945 Spring meeting was cancelled and the 1945 annual meeting was confined to officers and members of the Board of Control, who acted as proxies for the members at large and reported the proceedings by mail.

Joint TAPPI and AIChE Sessions

At the joint meeting of the American Institute of Chemical Engineers, and the Technical Association of the Pulp and Paper Industry, held in New York Feb. 27th and 28th, the following papers were presented:

Displacement Capacities of Mixing Impellers, J. H. Rushton, D. E. Mack; New Industrial Uses of the Votator, H. G. Houlton; Design and Operation of Ion Exchange Installation, R. B. Thompson, E. J. Roberts; Industrial Waste Disposal Problems, M. C. Fleming; Industrial Evaporator Design, H. B. Caldwell, W. D. Kohlins; Spiral Heat Exchanger Characteristics, A. M. Hargis, K. W. Coons, P. Q. Hewes; Dispenser Type Mixers, J. R. Powers, E. H. Schmiel; and Application of Electronics to Automatic Chemical Feed Systems, Robt. T. Sheen.

PERSONNEL

Columbia Promotes Newton to Research Post

William F. Newton has been appointed manager of market research and development for the Columbia Chemical Division of the Pittsburgh Plate Glass Company according to an announcement by W. I. Galliher, executive sales manager for the division.

Mr. Newton joined the Columbia Chemical Division's research staff during July, 1941. He was made division superintendent in charge of synthetic resins and related organic products two years later.

Mathieson Advances Wilmot and Clark

Nelson F. Wilmot has been appointed Chicago district sales manager and Merle S. Clark becomes St. Louis district sales manager of The Mathieson Alkali Works, according to an announcement from G. W. Dolan, president of the company. Mr. Clark will be in charge of the newly opened St. Louis branch office in the Paul Brown Building.

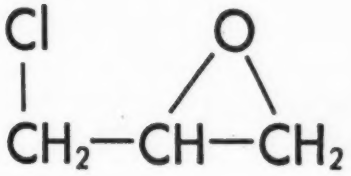
Dufour Promoted by Nicaro Nickel

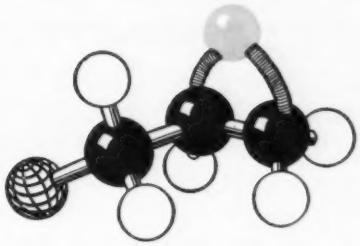
Maurice F. Dufour has been appointed general manager of the Nicaro Nickel Company, a subsidiary of the Freeport Sulphur Company, Langbourne M. Williams, Jr., president, has announced.

A graduate of Tulane University, Mr.

New Reactive Intermediate Available

EPICHLOROHYDRIN





PRESENCE of the epoxide ring and chlorine *in one compound* makes Epichlorohydrin an extremely reactive and versatile intermediate. Through the proper use of catalysts and reaction conditions the epoxide ring and the chlorine atom can be reacted either independently or simultaneously.

Ethers and esters of glycerine, glycerol alpha monochlorohydrin, and glycidol (2, 3-epoxypropanol-1) are types of compounds which may be readily prepared from Epichlorohydrin. Mercaptans and amines react with both epoxide ring and chlorine atom to yield a wide variety of compounds.

In addition, Epichlorohydrin, and its derivatives which contain the epoxide ring, undergo polymerization to give a number of substituted poly ethers.

Because of the diversity of compounds and polymers which can be prepared from it, Epichlorohydrin is suggested for consideration as an intermediate in manufacturing plasticizers, stabilizers, pharmaceuticals, surface active agents, rubber chemicals, acid gas absorbents, resin intermediates, disinfectants, dyes, adhesives, humectants, and cosmetics.

Free samples for evaluation.

Epichlorohydrin is now available in semi-commercial quantities

For more detailed information on the properties of Epichlorohydrin, write for Technical Bulletin #SC:46-3

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CUT OPERATING AND MAINTENANCE COSTS

● Useful for solutions which are highly corrosive, or for solutions which crystalize at normal temperatures and must be handled at temperatures up to 300°F, or for mixtures of solutions or solids which are both corrosive and abrasive.

● Patented sleeve of valve made of rubber or synthetics to meet special requirements. The 1", 2" and 3" sizes are built for continuous pressure up to 100 lbs.; the 4", 6", 8", 10" and 12" sizes up to 150 lbs.

● Recommended for transfer lines, for controlling flow in plant and in delivering product to storage or cars. Also useful in handling fine, dry materials. **Valve shuts tight even on solid particles.** When writing, state your problem.

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SALT LAKE CITY
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The Mine & Smelter Supply Co.

CANADIAN VICKERS, LTD. MONTREAL
W. R. JUDSON SANTIAGO, LIMA

Dufour joined the Freeport organization in 1933 and has held various posts in New Orleans and New York. In 1941 he was assigned to special research on the nickel concentration process for Nicaro.

Denham Advanced by du Pont

James S. Denham, assistant manager of the Rayon Department, has been appointed general manager of the Photo Products Department to succeed George A. Scanlan, who retired March 18 for reasons of health, the Du Pont Company has announced.

Detroit Testing Names Executives

W. H. DeGowin was elected a director and appointed general manager of the Detroit Testing Laboratory, 354 Bagley Avenue, Detroit, 26, at the corporation's annual meeting. W. P. Putnam was re-elected president; he is past president of the American Council of Commercial Laboratories. Other officers elected were: J. D. Stoddard, vice president; Henry J. Jameson, treasurer; and Mary E. Black, secretary.

Wilmington Expands Sales Staff

Wilmington Chemical Corporation, 10 East 40th Street, New York, announces several additions to its technical sales organization. Joseph M. Hoopes, formerly active in rubber chemical sales for du Pont, will represent Wilmington in the New England area. Rolf G. Grote will cover the territory from Southern New Jersey to North Carolina. The Canadian-Buffalo territory will be handled by R. J. Davidson, recently of the R. C. A. F.

More Veterans Join Arthur D. Little

Six more veterans have been added to the staff of Arthur D. Little, Inc., Cambridge, Mass., industrial research organization, making a total of eighteen veterans added since V-J Day.

The six veterans are: William A. Merdinyan, USNR, mechanical engineer; William G. Neall, USNR, chemical engineer; Ernest R. Poor, USNR, civil engineer; Carl G. Erikson, Jr., AUS, chemical engineer; Daniel J. Leone, AUS, clerk; and Alfred E. Forgette, USNR, maintenance.

Wins Rubber Group Award

Harry P. Burchfield, a research chemist at the Naugatuck Chemical Division of the United States Rubber Company, has been awarded first prize of $1500 by the Chicago Rubber Group of the A. C. S. for developing the best method to differentiate natural rubber from the various synthetics in sorting out scrap for the production of reclaimed rubber.

The test developed by Mr. Burchfield

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for Laminating and Dipping Purposes, Wax-Coatings, Moisture-Proofing, Glassines, Paraffine-Extenders, etc.
M. P. 130° F. up to 165° F.
in Olive-green, Amber and Natural Yellow colors
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A.S.T.M. Melting Point 160-165° F.
Needle Penetration at 77/100/5 = 13-16
High M. P. Straight Hydro-Carbon Base "ALKRA" Binding Agents
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has the advantage of being simple and reliable. It is based on the discovery that paper, impregnated with special chemicals, will develop characteristic colors when exposed to smoke from different types of rubber branded with a hot iron. For example, the smoke from a synthetic GR-S tire will turn the paper green, but smoke from natural rubber will turn it blue. Similarly oil-resisting synthetic GR-M or Neoprene will produce a characteristic red color.

Du Pont Promotions

Appointment of Robert L. Richards as assistant manager of the du Pont Rayon Department and Robert A. Ramsdell as manager of the Nylon Division, succeeding Mr. Richards, is announced by Benjamin M. May, general manager of the department.

At the same time he named Charles M. Switzer, Nylon Division director of production, as assistant manager of the division to succeed Mr. Ramsdell.

Hercules Sales Transfers

Eight technical sales representatives, who recently returned to Hercules Powder Company from the service or from ordnance plant employment, have completed a three-month re-training course and have been assigned by the Synthetics Department to sales offices in six districts. They will work with salesmen already there in providing more adequate service to customers.

Frank H. Crymes will join the San Francisco, Cal., office as district manager. Two men have been assigned to the New York City staff. They are: William Power, and Judson Hurd. George Osburn and Jordan P. Snyder are added to the Chicago sales staff.

Others in the group are: William A. Woods, assigned to the Boston, Mass., sales office, and Charles Huhn, who will work in the Wilmington, Del., district. Coleman Edgar will join the sales staff in Cleveland, Ohio.

Gamble Appointed Assistant To Monsanto President

Appointment of Edward W. Gamble, Jr., as sales assistant to the president of Monsanto Chemical Company is announced by William M. Rand, Monsanto president. From 1922 until 1942 Mr. Gamble was a sales and administrative executive of New York brokerage and investment banking houses, and through much of the war period served as an officer of the Office of Strategic Services.

Penn Salt Names Two New Sales Managers

J. G. Brunton has been named eastern sales manager and J. F. Francis has been named western sales manager of the Agricultural Chemicals Division of Pennsylvania Salt Manufacturing Company. Both Mr. Brunton and Mr. Francis have been

serving as assistant sales managers in their respective territories.

Mr. Brunton, a graduate entomologist of the University of California, joined the company in 1939. Mr. Francis, a graduate entomologist of the same university, came with Penn Salt in 1943.

Gould Wins Milk Chemistry Award

Ira A. Gould, Jr., University of Maryland professor, has been awarded the 1946 Borden Co. $1000 prize and gold medal for research in the chemistry of milk — particularly in the evaluation of sulfide formation causes.

Thornton Joins Carbide

Norwood C. Thornton, plant physiologist, formerly with the Boyce Thompson Institute for Plant Research, Yonkers, N. Y., has joined the Fine Chemicals Division of Carbide and Carbon Chemicals Corporation, a Unit of Union Carbide and Carbon Corporation, New York, N. Y. He will assist in the study of the use of synthetic organic chemicals in various biological fields and similar applications.

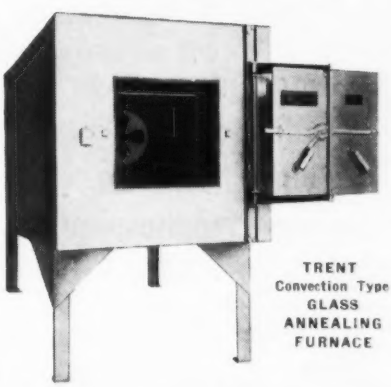
Dr. Thornton, a graduate of the University of Maryland and of Cornell University, has been engaged in research activities concerned with the effect of carbon dioxide and other chemicals on the storage of plant tissues.

Whitemarsh Adds to Research Staff

Eight additional researchers have joined the staff of almost 100 at the Pennsylvania Salt Manufacturing Company's Whitemarsh Research Laboratories in the expanded post-war research program under S. C. Ogburn, Jr., Pennsalt's manager of research and development.

The new staff members are Martin Leatherman, a former Major in the Chemical Warfare Service; Robert H. Tiers, formerly with Pratt & Whitney Aircraft Corp.; W. J. Knapp, formerly with North American Cement Co., and recently in the U. S. Navy; Glendon B. Kyker, formerly

For Electric BOX TYPE FURNACES



TRENT Convection Type GLASS ANNEALING FURNACE

For automatically controlled annealing of laboratory glassware at 1100° F. For flasks, tubes, columns, etc.; experimental and repair work. 110 or 220 V., single or three phase.

Illustrated above: Larger furnace is TRENT Type H Furnace for hardening and annealing miscellaneous ferrous and non-ferrous small products and parts, and the heating of chemicals, at 600° F. to 2000° F. Rated 18 K.W., 230 V. Furnished complete with automatic temperature, recording, in-put and shut-off controls.

Smaller furnace is TRENT MLR Laboratory Box Furnace for experimental and small production heat treatment at temperatures up to 2000° F. Ample work chamber; counter-balanced, lever-operated door; automatic controls. Various sizes in stock.

Both furnaces equipped with TRENT patented "Folded-and-Formed" Heating Elements, and carried in stock for prompt delivery.

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Amyl Acetate	Nitrocellulose
Arsenic White	Paradichlorobenzene
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Dry Colors	Sulfur
Film Scrap	Titanium Dioxide
Methylene Chloride	Urea
Nickel Sulfate	Zinc Sulfide

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WALTER MOESCH & COMPANY

Importers of Chemicals
Zurich - Switzerland

with Hooker Electrochemical Co.; H. A. Kraftson, formerly with E I. du Pont de Nemours Company; Frederick D. Loomis, recently released from the U. S. Army; Peter Zappasodi, chemist at Pennsalt's Philadelphia plant; and E. J. Nolan, previously with Rohm & Haas Co.

Ansul Names Hood As Secretary

Robert C. Hood, who received his discharge in November from the U. S. Coast Guard in which he had the rating of lieutenant was elected secretary of Ansul Chemical Company, Marinette, Wisconsin, at the firm's annual meeting of the board of directors.

H-VW-M Adds to Staff

Hanson-Van Winkle-Munning Co., Matawan, N. J., has announced a number of staff changes including the return of several of its staff from the armed forces.

John A. Bauer has been appoined sales manager of the company, after serving in Pittsburgh, Philadelphia, and New York sales offices.

Ralph R. Granquist has been named manager of the Chicago office, and Harold R. Smallman, with Chicago headquarters, remains as western manager.

William J. Wise and Walter J. Jurman have rejoined the company, and Edward M. Close has been appointed assistant purchasing agent.

Tarplin Joins Warner

R. D. Hetterick, general sales manager of William R. Warner & Co., Inc., manufacturing pharmaceutists, announces the appointment of E. M. Tarplin to the position of manager of the Professional Service Department.

Mr. Tarplin, a graduate of Massachusetts Institute of Technology, was formerly an associate director of Sales Education of Wyeth, Inc., Philadelphia, Pa. His duties and responsibilities at Warner will consist of the educational direction of the Professional Service Department and the supervision of the preparation of basic training materials.

Du Pont Announces Personnel Changes

The retirement of the heads of two divisions of the Du Pont Explosives Department has been announced. They are C. A. Woodbury, manager of the Technical Division, and I. J. Cox, manager of the American Glycerin section and production manager of the Black Powder section.

Mr. Woodbury will be succeeded by B. H. Mackey. The duties of Mr. Cox in the American Glycerin section will be taken over by G. H. Loving, an assistant director of sales of the Explosives Department, and those in the Black Powder section will be taken over by H. K. Babbitt, production manager of the Special Products section.

Personnel Notes

SIDNEY R. DODD has been appointed chief chemist of the Chemical Research Department of Oakite Products, Inc., New York, N. Y.

R. H. CROSBY, JR., recently discharged from the CWS has returned to Crosby Chemicals Inc. as executive vice-president.

ROBERT SCHMEIDLER, lately Colonel with the Army Air Forces, has joined the staff of Foster D. Snell, Inc., Consulting Chemists and Engineers, 305 Washington Street, Brooklyn 1, New York, as business manager.

F. B. HAVENS has joined the technical service staff of the Pigment Department, of Calco Chemical Division, American Cyanamid Company, Newark, N. J.

Mr. Havens was formerly vice president and chief chemist of the Prince Manufacturing Company, Bowmanstown, Pa., and is a graduate of the Towne Scientific School, University of Pennsylvania.

HOWARD N. VERRAULT has joined the sales staff of Velsicol Corp., and will be headquartered at New York.

BARCLAY E. MACKINNON, recently returned from military service, has been appointed purchasing agent of the New York Quinine and Chemical Works, Inc., Brooklyn.

FORREST M. LUCKETT, has been appointed branch manager of the Organic Chemicals Division office of Monsanto Chemical Company, in Cincinnati. His territory includes Southern Ohio, Northern Kentucky, and all of West Virginia except the northern tip and a small portion of the eastern part of the state.

JOSEPH F. PADLON, formerly colonel, CWS, has joined Allen A. Dicke, 120 Broadway, New York, and will specialize in patent law pertaining to the chemical and pharmaceutical fields.

Election of DAVID RASCH as secretary of Winthrop Chemical Company, Inc., by the board of directors, was announced recently by Theodore G. Klumpp, president.

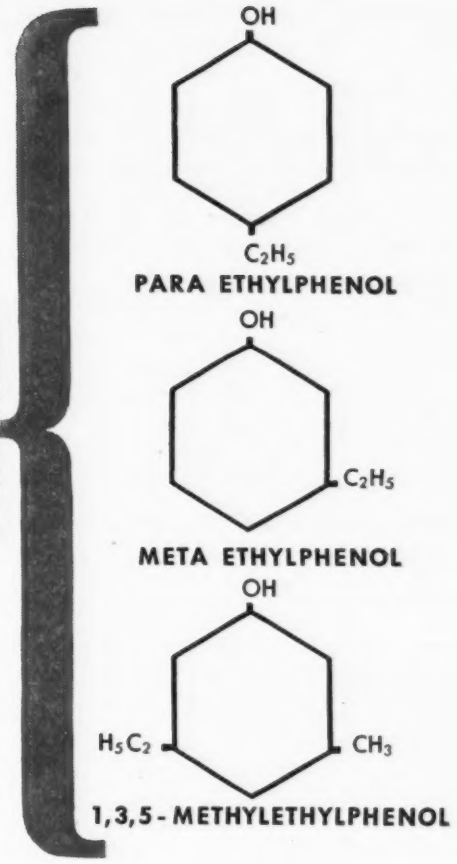
C. W. WESTPHAL has been appointed technical representative of the Dorr Co. Inc., with headquarters in South America.

C. A. GUBITOSI, graduate of St. John's College, recently lieutenant in the U. S. Army, has joined the analytical division of New York Quinine and Chemical Works.

RICHARD L. DAVIES has recently been appointed assistant to the president of Pennsylvania Salt Manufacturing Co. Mr. Davies has been in charge of market research and development for the company.

RAYMOND REUTER has joined the staff of the Chicago Chemical Company, which

REILLY
Ethyl Phenols



● Available for the first time from commercial production, Reilly now offers two new Ethylphenols. These are in addition to the Reilly Para Ethylphenol which was recently announced. Each of these chemicals is offered in a 95% pure grade.

Suggested uses are in the manufacture of plastics, insecticides, fungicides, disinfectants, pharmaceuticals, rubber chemicals, plasticizers, photographic compounds, dyestuffs, wetting agents, and in various organic syntheses.

Other refined Reilly phenols include: phenol, ortho cresol, meta cresol, para cresol, 1,2,4-xylenol, 1,3,4-xylenol, 1,3,5-xylenol, and 1,4,2-xylenol.

SEND FOR 56-PAGE BOOKLET *describing the full line of Reilly Coal Tar bases, acids, oils, chemicals and intermediates.*

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Reilly COAL TAR PRODUCTS
★ 17 PLANTS *To Serve the Nation*

is a subsidiary of the National Aluminate Corporation, as sales and technical representative.

WILLIAM HORACE ROSS has been retired from the U. S. Department of Agriculture after 34 years of research work which contributed greatly to improvements in crop production, mostly through increasing knowledge of fertilizers, their sources, methods of production, conditioning and application. Alone or with other scientists he produced 135 scientific papers in his chosen field.

C. D. McGrath, Jr., has joined the New England sales staff of Orbis Products Corp., it was announced this month by F. Deming Hoyt, resident vice-president in Boston.

Mendel F. Freudenheim, consulting chemist, is now operating his business under the corporate title of FREUD LABORATORIES, INC.

JOHN ANDREWS has joined the technical sales staff of Godfrey L. Cabot, Inc., carbon black manufacturers of Boston.

HAROLD ROSS, former chemist in the emulsion section of the Research and Development Division of S. C. Johnson & Son, Inc., Racine, Wisconsin, has been named production manager of S. C. Johnson & Son, Ltd., West Drayton, Middlesex, England.

Heads Pennsalt Washington Bureau

G. Webber Knight, appointed manager of Pennsalt's Washington office. As a result of its war experience the company has decided on permanent establishment of capitol headquarters to handle company interests involving both domestic and foreign government agencies.

JEROME F. MCGINTY, former executive officer, Chemical Commodity Division, Chemical Warfare Service, has joined Millmaster Chemical Company, 551 Fifth Avenue, New York City, as sales manager for miscellaneous chemicals.

ARTHUR M. SMITH, for many years vice president and technical director of Synthetic Nitrogen Products Corp., has joined Position Securing Bureau, Inc., 45 John Street, New York 7, N. Y. as placement manager in charge of the Chemical Department.

Evans Chemetics, Inc., manufacturing chemists, New York, announces that RICHARD D. EWALD has joined the sales staff in the Chemicals Division.

A graduate of Amherst, Mr. Ewald's earlier experience was with the Killian Research Laboratories, New York; in the pharmaceuticals field with G. D. Searle, Chicago; and Westvaco Chlorine Products Company of New York.

EDWARD M. WILSON, recently released from the Army after serving four years as a Captain in the Chemical Warfare Service, has returned to the Pennsylvania Salt Manufacturing Company, and has been appointed Philadelphia district sales manager of the Heavy Chemicals Division.

JOSEPH N. MURPHY, recently released from the Corps of Engineers with the rank of Captain, has returned to Quaker Chemical Products Corporation, Conshohocken, Pa., and has resumed his old position as a process engineer in the sale of the company's chemical specialties for the textile industry.

RIDGLEY G. SHEPHERD, JR., formerly chemical engineer with the Polaroid Corporation, has joined the chemical engineering research staff of Gustavus J. Esselen, Inc.

LUTHER L. YAEGER has joined the staff of the Bjorksten Laboratories as a research chemical engineer, in the Plastics Department.

MURRAY W. HEALY, recently released from the U. S. Army, has rejoined the Industrial Chemical sales staff of The Dow Chemical Company and will work in the St. Louis, Missouri, office.

The Diamond Alkali Company announces the appointment of W. A. CRICHLEY as controller to fill a vacancy created by the resignation of M. L. Jarboe, vice-president-controller.

WALTER W. FASSIG has joined the Naval Stores Department of Hercules Powder Company as entomologist in charge of the biological laboratory at the department's Brunswick, Ga., plant.

Winner of three combat awards as a Captain with the Army's 117th Combat Engineers, J. CALVIN LEE has returned to the Cincinnati area as a representative for the Columbia Chemical Division of the Pittsburgh Plate Glass Company. He will be located at the company's offices, Gwynne Building, Cincinnati.

ROBERT W. KRESS of the Special Chemicals Division, Pennsylvania Salt Manu-

AMECCO CHEMICALS Recommends

PAROIL 170

Chlorinated Paraffin Resin

A hard, brittle, non-flammable powdered resin compatible with drying oils, plasticizers and most film forming materials.

Recommended for
Fire Retardant Paints
Textile Finishes
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Industrial Finishes

Send for a sample and further technical information.

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facturing Company, has been promoted from assistant to Joseph W. Manz, senior sales serviceman in Chicago, to senior sales serviceman of the Northern Ohio area. He will make his headquarters in Cleveland.

Henry Rejoins Joseph Turner Co.

Jack Henry, lieutenant with the U. S. Navy since 1943, has returned to his position in the sales department of Joseph Turner & Co., Ridgefield, N. J.

JOHN J. HOWE has joined Heyden Chemical Corporation's Development Division. He was recently released from the U. S. Naval Service where he was assistant to the Naval Inspector of Ordnance at Charlotte, N. C.

HENRY SONNEBORN III, until recently on active duty as a lieutenant in the U. S. N. R., and HANS SCHINDLER, research chemist, have joined the technical staff of the Petrolia, Pa., refinery of L. Sonneborn Sons, Inc.

NEWS *of* SUPPLIERS

First Machinery Corp., 819-837 E. 9th St., New York, is moving to a recently purchased building at 157 Hudson St., early this month, according to President Fred R. Firstenberg.

In its larger quarters the company plans to extend its sales of new equipment, as well as continuing in the purchase, rebuilding, and sale of used process machinery and equipment.

Brown & Root, Inc., announce the expansion of their industrial services through the creation of a Petroleum and Chemical Division, specializing in the design, engineering and construction of process plants for the oil, gas and chemical industries.

The firm has done work in these fields for more than a decade, including construction of chemical plants, compressor stations, pumping stations, pipe lines, gathering systems and the rendering of general utility services.

The International Nickel Company, Inc. has announced the opening of the St. Louis Technical Section of its Development and Research Division as of March 15. It will be located in Room 810 of the Ambassador Building, 411 North Seventh Street, St. Louis 1, Missouri.

The new Section, under the direction of George A. Fisher, Jr. will furnish technical assistance in the territory embraced by the State of Missouri, southern half of Illinois, southwestern section of Iowa, northern half of Arkansas, western portion of Tennessee and States of Nebraska and Kansas.

International Paper Products Division of International Paper Company has opened a branch sales office in Boston at 45 Milk Street. A. G. Clarke is district sales manager.

International Paper Products Division sells the heavy-duty multi-wall kraft paper bags made by Bagpak, Inc., and George & Sherrard Paper Company, wholly-owned subsidiaries of International Paper Company.

George S. Witham of Hudson Falls, N. Y., has become associated with **The Bristol Company,** Waterbury 91, Connecticut, as consultant on development and sales, Pulp and Paper Instrument Division, according to an announcement made by H. E. Beane, sales manager.

The following Witham instruments will be manufactured and sold under the Bristol name: Witham Freeness Recorders, Witham Consistency Recorders, Witham Low-Consistency Recorders, and Witham Sewer-Loss Recorders.

Edward L. Becker, former N. Y. district manager for Crocker Wheeler Electric Mfg. Co., has been named assistant to Emil A. Schroth of **Emsco Equipment Co.**, Newark, N. J., buyers and sellers of used and surplus processing machinery.

BIGELOW-GIBSON, INC., has announced the opening of their new distributorship for industrial rubber products at 1026 Water St., Toledo.

Principal items supplied by the company are the many types of industrial hose and conveyor and transmission belts manufactured by Hewitt Rubber Corporation, Buffalo, N. Y. Other items they will distribute from the Toledo offices and warehouse include cotton and canvas belting, floor matting, and molded rubber specialties; flat and round leather belts; rubber gloves and aprons; oiled clothing, and a complete line of V-belting.

Henry E. Jacoby has announced the formation of JACOBY-TARBOX CORPORATION, the principal officers of which are George S. Tarbox and himself. The new organization will handle all of the accessory business and specialties, such as filter paper, fittings, and a complete line of filtration accessories, all of which have been heretofore handled personally by Mr. Jacoby and his organization.

William F. Jetter, formerly assistant to the president of AIR PREHEATER CORPORATION, Wellsville and New York City, has been elected a vice president of the company.

O. S. Duffendack, president of PHILIPS LABORATORIES, INC., recently organized to act as research center for all Philips interests in the United States, has announced the following additions to the staff at Irvington, N. Y.: Dr. James G. Black has joined Philips as chief of the Division of Miscellaneous Projects and Analytical Laboratories, and Carol M. Veronda comes to Philips from the Naval Research Laboratory where he was occupied with radar work, as assistant engineer, Microwave Section.

THE HAYS CORPORATION, Michigan City, Indiana, manufacturers of boiler room and industrial instruments and controllers, announces that, Cochrane Flow Meters, formerly manufactured by The Cochrane Corporation of Philadelphia will be sold by Hays representatives as Hays-Cochrane instruments for flow, liquid level, pressure and temperature measurement.

The flow meters will continue to be manufactured in Philadelphia by The Penn Industrial Instrument Corporation—an organization comprised of the same men who have been responsible for the production of these meters for many years.

James F. Olsen, formerly sales manager of TURBO-MIXER CORPORATION, a unit of General American Transportation Corporation, has been transferred to the Chicago office of General American Process Equipment as manager of sales.

THE WELLS H. MORTON CO. has been appointed to distribute and serve users of General Controls' complete line of Automatic Pressure, Temperature and Flow Controls in the Provinces of Albert and Saskatchewan in Canada.

Steuart E. Tray has been appointed assistant manager of the basic industries department in charge of the new chemical processing machinery section at the ALLIS-CHALMERS MFG. CO., Milwaukee, Wis., according to an announcement by G. V. Woody, department manager.

THE BROWN INSTRUMENT COMPANY division of Minneapolis-Honeywell Regulator Company has opened a sales and service office at 16 State Street, Rochester, N. Y.

The new Brown office, under the supervision of Gerald L. Britton, has been established, according to the Brown company officials at Philadelphia, to provide more prompt and efficient customer service and as part of its program of sales and production expansion.

John E. Slaughter, Jr., vice president of THE GIRDLER CORPORATION, Louisville, Ky., in charge of the firm's Votator Division, has announced the appointment of Allen McKee Bond, Jr. to Votator's technical staff.

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CHEMICAL INDUSTRIES

★ *Prepared by the Advertising Council in Cooperation with the American Red Cross* ★

CONTINENTAL CAN COMPANY, announces that George H. Muth, recently released from the Army, has resumed his position as manager of the commercial research department. He also has been appointed staff assistant to the vice president in charge of sales.

LESLIE CO., Lyndhurst, N. J., manufacturers of regulators, controllers and whistles, announces several changes in officers as a result of elections held at the recent annual meeting.

S. Inglis Leslie, president of the company since 1926, has been elected chairman of the board of directors. John S. Leslie, who has been vice president and general manager since 1943, was elected president. J. M. Naab was re-elected vice president and treasurer.

The appointment of Edward B. Maire as manager of the Chicago Factory Branch, 822 So. Michigan Ave., Chicago 5, Ill., was recently announced by J. F. Ray, director of sales, GENERAL CONTROLS CO., 801 Allen Ave., Glendale 1, California.

H. H. Bristol, president of THE BRISTOL COMPANY OF CANADA, LTD., announces the appointment of Charles Webber as managing director of The Bristol Company of Canada, Ltd.

In assuming these duties, Mr. Webber brings to The Bristol Company of Canada, Ltd., over 25 years of experience in instrument manufacture and sales. He was formerly New York district manager of The Bristol Company, and prior to that, was attached to The Bristol Company at Waterbury, Conn.

REITER ENGINEERING COMPANY, INC. located at 1619 West Thompson Street, Philadelphia, Pa., has been appointed agent by S. P. Kinney Engineers, Inc., to handle the Brassert automatic self-cleaning water strainer in the Philadelphia District.

O'Roland Read has been appointed director of sales of SPEEDWAYS CONVEYORS, INC., 1261 Niagara Street, Buffalo, manufacturers of Speedways Gravity Case Conveyors.

WHEELCO INSTRUMENTS COMPANY, Chicago, industrial instrument manufacturers, announce the addition of Francis H. Beaupre and Bruno H. Ramthun to their application engineering department.

These men will serve in a liaison capacity with the sales application, engineering design, research and production departments on technical matters pertaining to the details and use of Wheelco istruments and associated accessories.

At a recent meeting of the stockholders of the DESPATCH OVEN COMPANY, A. E. Grapp was elected chairman of the board of directors.

The stockholders also elected H. L. Grapp to the office of president and general manager.

RE-BO MANUFACTURING CO. has relocated its plant from Knoxville, Tenn., to Bedford, Va., where the company has purchased the former Continental Can property. The company plans immediate utilization of the 83,000 feet of factory space acquired for manufacture of its line of materials handling equipment.

FILTER MEDIA CORPORATION announces the moving of its factory and main office from Irvington-on-Hudson, N. Y., to Hamden 14, Conn., where it will have much larger quarters. Branch offices in Chicago and Salt Lake City are continued.

Packaging & Shipping

(Continued from page 640)

Section 346 (g) has been amended to read as follows:

"(g) Spec. 5A.—Metal drums not exceeding 30 gallons capacity or metal drums of bilge type not exceeding 33 gallons capacity and with openings not exceeding 2.3 inches in diameter. Use of these containers will be permitted because of the present emergency and until further order of the Commission."

The purpose of this amendment is to prohibit the use of open-head type drums and to restrict openings to not more than 2.3" for shipments of methyl bromide.

Section 348 (b) is amended restricting openings to not more than 2.3" for shipments of phenyldichlorarsine.

Section 349 (b) is amended as follows:

"(b) Spec. 5, 5A, or 5B.—Metal barrels or drums, with openings not exceeding 2.3 inches in diameter."

Section 349 (c) and 349 (d) are amended restricting openings to 2.3" in diameter for ICC 17C, 17E and 37D metal drums for the shipments of poisonous liquids, Class B.

Section 402 (q) is amended as follows:

"(q) When it is known that subsequent shipments of these packages may be made by consignees in less-than-carload or less-than-truckload quantities or in carload or truckload quantities to a point where they may be handled by other than the original consignee, the original shipper should attach labels to the packages as would be required for less-htan-carload or less-than-truckload shipments."

The purpose of the amendment is to provide for the labeling of packages when handled by carriers' employees whether in transit or at destination.

There were also amendments to existing specifications for packages which can be determined by consulting the ICC Docket No. 3666. These amendments referred to Specification ICC5D to provide a container lined with a newly developed synthetic material found after exhaustive tests to perform as well as or better than existing containers. Specification ICC13 specifying sizes of markings which must be applied at 5/16" high. Specification ICC21 making it mandatory again to use Linderman joints, glued, cancelling emergency authority for butt-jointed heads. Also in this specification minimum thickness may be reduced to 25/32" for lumber dressed two sides under "Wooden Heads."

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Sole Agents

CHEMICAL SPECIALTIES NEWS

Claim Limited Usefulness for 666

Tests in the U. S. show that the English-developed insecticide, hexa-chloro-cyclohexane, sometimes referred to as 666, is not a replacement of DDT and has several shortcomings, according to W. H. Tisdale, director of the du Pont Pest Control Research Laboratory.

Major disadvantages noted by Dr. Tisdale are the disagreeable pungent odour of the insecticide, and the fact that it does not possess the long-lasting toxicity in the field which characterizes DDT. It is, however, more toxic to flies and cockroaches than DDT, and is superior in combatting such pests as aphids, grasshoppers, wire worms, and the boll weevil.

Conditionally, du Pont scientists point out that the insecticide is not effective under normal weather conditions for more than 2 to 4 days, and it is more likely to damage foliage than DDT. Its repugnant odour constitutes a disadvantage as far as extensive household use is concerned.

Sterling Expands Southern Facilities

A $1,000,000 program of plant improvement and new construction to provide additional manufacturing facilities for its Chas. H. Phillips Co. division has been announced by James Hill, Jr., president, Sterling Drug, Inc.

Under the program, a new plant will be erected at Gulfport, Miss., at a cost of $700,000, while a 3-story wing will be added to the present plant at Glenbrook, Conn., at a cost of $300,000.

Mr. Hill said construction of the Gulfport plant, a 2-story structure with 64,000 square feet of floor space, will begin this summer. Manufacturing operations are scheduled to start before the end of the year.

Stearns Boosts Amino Output

The installation of new equipment by Frederick Stearns & Co., Detroit, has increased production of Parenamine, amino acid solution, by 400 per cent.

Additional expenditures have also been made for research apparatus to further laboratory studies on amino acids, according to J. Mark Hiebert, vice-president.

Beacon Opens Florida Plant

Beacon Products Co., Philadelphia, manufacturers of household cleaners and bleaches, is opening a branch plant in Jacksonville, Fla. The new unit is the sixth branch that the company has established.

Francis W. Farnsworth, formerly assistant state chemist of Florida, has been named general manager of the Jacksonville division.

Found Firm for Plaster-Plastic Distribution

Palestic Inc. has been founded by Engineering Associates, St. Charles, Ill. to handle the manufacture and distribution of the company's recently announced modified Plaster of Paris composition.

Produced by the addition of chemicals to ordinary plaster, Palestic is claimed to possess properties midway between those of stone and plastics. It can be sanded, sawn, produced in any color, and at low cost, for large scale fabrication or the manufacture of novelties.

New Chemical Co. Formed

The Kroma Chemical Co. has been organized at Raritan, N. J. for the manufacture of a complete line of pigment dispersions in both water and organic soluble vehicles. Such concentrated pigment pastes are compatible with coating compositions and cements of the synthetic rubber and vinyl type.

Officials of the new concern are: John S. Booth; Edward J. Sheridan; and Francis J. Tuttle.

Hood Chemical Enters Specialty Field

Hood Chemical Co., New York, distributors of water purification and laundry chemicals, is entering the retail specialty field with a new household cleaner tradenamed Sing. Plans are also being readied for marketing two packaged synthetic detergents, to be known as Indra and Hydra, for use in home laundry and dishwashing machines.

The sales campaign is being directed by Kenneth P. Dietrich, recently appointed Hood president, and former manager of merchandising and specialty sales for Diamond Alkali.

New Leather Cleaner

Link Laboratories, Kansas City, Mo., has begun manufacture of Leather Lather, a specialty composition designed to clean all types of leather without affecting inherent pliability. A colorless, liquid preparation, it is claimed that the new product will clean suede and pastel shades of imitation leathers as well as footwear, etc.

Stated to contain no wax or petroleum derivatives, Leather Lather is applied without rubbing, and a polymerizing agent "lifts" embedded dirt to the surface so that it may be removed with a damp cloth.

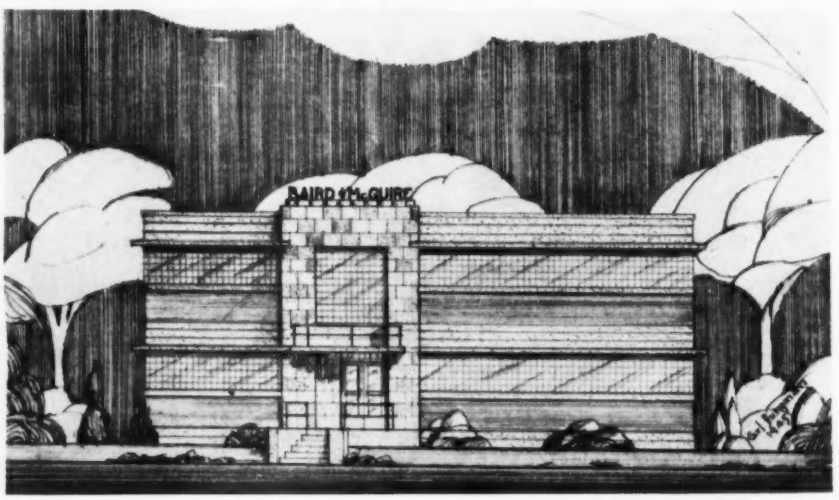
It will be marketed in 4 and 16 ounce bottles, and gallon jugs, through chemical, drug, and hardware jobbers.

Try DDT for Jap Beetle Larvae Control

The use of DDT to aid in the control of Japanese beetle larvae in the soil shows much promise as a substitute for arsenate of lead in tests now being carried on in the Hudson River Valley by Dr. J. A. Adams, entomologist of the State Experiment Station at Geneva.

Preliminary tests made with DDT used at the rate of 25 pounds to the acre reveal that this treatment is as effective as a 500-pound application of lead arsenate. DDT is believed to be no more toxic to warm-blooded animals than equal amounts of arsenate of lead. In addition only one-

Baird & McGuire's New Research Laboratories



Baird & McGuire, Inc., St. Louis, Mo., is completing construction of the glass brick and concrete building sketched above to house its bacteriological, chemical, and research laboratories. A major part of the laboratory work will be devoted to the development of more efficient germicides.

twentieth as much poison need be added to the soil so that food crops probably could be grown on DDT-treated soil with safety much sooner than where arsenate of lead is used, according to Dr. Adams.

Even on soils where a permanent turf is desired, such as lawns, golf courses, and the like, the cost of treatment would be greatly reduced by the use of DDT. There are indications that DDT may affect some crops, but apparently it is less harmful to grasses than arsenate of lead.

Army Sunscreen Formulation

A suntan preparation, which permits tanning but prevents sunburn, developed by the U. S. Army Quartermaster Corps, has the following composition in per cent by weight:

Shellac	13.64
Isopropanol	29.90
Linseed oil	3.48
Stearic acid	.14
Triethylene glycol di-2-ethyl butyrate	.79
Diethylene glycol monoethyl ether	1.09
Menthyl salicylate	2.49
Titanium dioxide	36.82
Borax	2.24
Sulfated fatty alcohol	.29
Mineral black	1.16
Magnesium oxide	.40
Bentonite	4.87
Petrolatum	2.69

Penn Salt Markets DDT Packaged Insecticide

Penn Salt Co., Philadelphia, has recently placed a 5 per cent DDT dust on the market under the trade name of Knox-Out Garden Dust. Marketing plans for the insecticide call for distribution through hardware, drug, seed, department, and chain stores.

The insecticide, which is recommended for potato bugs, corn earworms, and corn borers is packed in one pound sifter cans and three pound bags.

Dexter Appoints Mytelka

The Dexter Chemical Corp. announces the appointment of Morris Mytelka as chemist in charge of production for its textile chemical division.

After gaining his degree in chemistry at Rutgers, Mr. Mytelka was associated with the laboratories of the Bakelite Corp. and the Battery Manufacturing Corp. For the past ten years he has been analytical and research chemist for the Hart Products Corp.

Promote Tyrothricin Bandage

Johnson & Johnson Inc. has scheduled the largest advertising campaign in the company's history to feature the new bandage impregnated with the antibiotic tyrothricin, developed late in 1945.

Atlas Powder Engages Metz

Donald A. Metz, formerly with Winthrop Chemical, and recently Lt.-Col. with the U. S. Army, has been engaged by Atlas Powder as technical service manager of its Zapon Division. Mr. Metz will specialize in industrial finishes problems and will be headquartered at Stamford.

Pittsberg Chemical Names Swain Insecticide Manager

Pittsberg Chemical Co., Los Angeles, has appointed A. F. Swain to the post of manager of its Insecticide and Fumigation department.

Parker Markets Gasket Seal Compound

The development of a general-purpose thread and gasket sealing compound, to be known as Uniseal, is announced by Parker Appliance Company, Cleveland.

A new organic product evolved by the Parker Special Products Division, Uniseal produces a high efficiency seal which is proof against air, water, steam, gas, gasoline, oil, hydraulic fluids, and the aromatics. Thorough testing has shown virtual insolubility in gasoline, kerosene, Stoddard solvent, benzene, xylene, carbon disulfide, the ketones, acetones and the various aromatic aviation fuels, according to the manufacturer.

Cleaner for Furs, Upholstery and Rugs

In U. S. Patent 2,364,608, G. H. Edwards describes a dust-collecting and dirt-absorbing mix for cleaning rugs, upholstery, furs, or the like, which consists of:

Diglycol stearate	10 lb.
Water	22 gal.
Stoddard solvent	10 gal.
Carbon tetrachloride and naphtha	16½ gal.
Deodorized hydrocarbon solvent (b.p. 379°-468° F)	3½ gal.
Soap	13 lb.
Wood flour	192 lb.

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CANADIAN NEWS

Pulp and Paper Plan Major Expansion

The Canadian pulp and paper industry, which has long been the largest manufacturing industry in the Dominion and a major consumer of chemicals ($13 million —1944) is embarking on a substantial expansion program to augment both the tonnage and types of its products, which presages heavy purchase of processing equipment and an eventual bolstering of chemical demands.

In Northern Ontario alone, current corporate plans call for additional capital investments totalling some $75 million during 1946 in the construction and reconstruction of pulp and paper mills.

The erection of a new sulphate pulp mill, and creation of a townsite, estimated to cost more than $15 million, is planned by the Kimberly Clark Corporation, Neenah, Wisc., near Schreiber, Ont. Initial operation of the new unit, to be known as Long Lac Pulp and Paper Co., Ltd. is scheduled for 1947.

In the same area, Brompton Pulp and Paper Co. Ltd., has invested an additional $10 million and Marathon Pulp Co. Ltd. is proceeding with construction of its nearby $15 million project. Likewise, Spruce Falls Pulp and Paper Co., Kapuskasing, is investing an estimated $10 million; Kalamazoo Vegetable Parchment Co. Ltd., Espanola, $10 million; Minnesota-Ontario Paper Co., Fort Frances, $6 million. In addition, Provincial Paper Co. Ltd., and Ontario Paper Co. Ltd., are understood to be spending substantial amounts in the rehabilitation and expansion of their facilities.

Similar programs are being carried through by other companies in Quebec, and British Columbia, to provide a concrete indication of the still-growing importance of one of the nation's prime chemical consuming industries.

Two New Polystyrene Units Scheduled

A recent announcement by the Monsanto Chemical Co., to the effect that it is constructing a plant for the production of polystyrene, points up the fact that this thermoplastic is scheduled to play a leading role in the development of Canada's plastics industry. As yet, no polystyrene has been produced commercially in the Dominion, although the Monsanto unit is scheduled to come in this year, and Dow anticipates that its 500,000 pound per month project at Sarnia, Ont., will be operating by September.

Both companies will be supplied with monomeric styrene by the government-owned synthetic rubber producer, Polymer Corp., Sarnia, Ont. The Dow plant is directly adjacent to the monomer-producing facilities, and located in Ontario, where the bulk of plastic molding activities are centered. Monsanto, on the other hand, situated at Montreal, some 450 miles from the styrene source, is within 300 miles of major Canadian consuming markets, with ocean port advantages to facilitate the development of Empire export trade.

Appointed President of Dow Chemical (Canada)

N. R. Crawford, formerly manager of Dow's Los Angeles styrene plant, has been named president of Dow Chemical Co. of Canada Ltd. Mr. Crawford will direct the company's Canadian expansion program, including completion of the polystyrene plant, and a second—several million dollar project—now being drafted to serve Canadian and Empire markets.

Naugatuck Brings In Commercial 2-4-D Unit

Naugatuck Chemicals, Ltd., Canadian subsidiary of U. S. Rubber Co., has begun commercial production of 2,4-dichlorophenoxyacetic acid, more popularly known as 2-4-D weedkiller, and is completing arrangements for the distribution of the concentrate to accredited packagers and distributors. This chemical has not been made in Canada before, with the exception of Naugatuck pilot plant output carried through since last Fall, and such limited quantities as have been used experimentally to date have been imported from the U. S. A.

The Canadian compound formulation will differ in some respects from those offered in the U. S. A., in keeping with the needs of different regional conditions. Current plans call for limited production this year so that field tests may be checked carefully and to permit the public to become acquainted with both the advantages and disadvantages of the selective herbicide.

It is expected that its uses at first will be confined in the main to application on lawns, golf courses, roadsides, etc., but the potential market volume existing in the suppression of weeds in field crops, such as wheat, oats, barley, and other narrow leaf grains, in Canada's vast—basically agricultural -- Western provinces, is not being overlooked.

Plan Construction of Titanium Pigments Plant

Canadian Titanium Pigments, Ltd., affiliate of National Lead Company and Canadian Industries, Ltd., is readying plans for the construction of Canada's first plant for the manufacture of titanium pigments.

When this organization was originally formed in 1937, a site was acquired at Cap de la Madelein, Quebec, but market, and latterly war, conditions deferred the creation of manufacturing facilities. Hence, the company has confined its activities to the distribution of titania formulations imported from the parent National Lead Co.

Although there are numerous ilmenite deposits in Canada, none is regarded as commercially exploitable, and officials state that the proposed plant will probably be supplied with ore imported direct from India.

The capacity of the unit, in which National Lead processes will be employed, will be set at a minimum of 14 million pounds of pigments per annum, with total investment expected to amount to several million dollars. The unit's output will be reserved essentially for domestic paint and paper markets.

New Canadian Barytes Production Record

New output records were established during 1945 by Canadian Industrial Minerals, Ltd., war-born barytes producer, with deliveries of crude and ground barytes totaling 96,500 tons compared with 94,700 tons during the preceding year. Established in 1940, for the exploitation of long-latent Maritime deposits, the company produced only 10,000 tons in its first year of operation but has progressively expanded the scope of its operations since that time to become the Dominion's major barytes source.

In that the ore is not too suitable for paint grade barytes, primary attention has been devoted to the cultivation of export oilfield markets. Currently, the mine is supplying the total barytes requirements of Trinidad, as well as shipping some quantities to eastern U. S. coast centers and Venezuela. In addition, some 4000 tons is scheduled for shipment to England

during the year, and trial lots have gone forward to Egypt to determine the possibility of entering the Near East markets.

To date most of the production has been from an open cut, and although ample ore is in evidence for the next few years' requirements, plans are being completed for the sinking of a 400-foot shaft to permit conventional underground mining.

Consider Installation Novel Sulphide Roasting Unit

Cochenour-Willans Gold Mines, Ltd., in the Red Lake district of northern Canada, is considering the installation of the first unit in Canada to utilize the Dorr Fluo-solid process for the treatment of sulphide-containing gold ore. Heretofore the mine has had to ship its concentrate several hundred miles for final refining, in that the construction of conventional roasting facilities at the mine site is impractical.

In view of the large number of gold mines, mining refractory ores, so located in remote sections as to render operations economically borderline with existing refining processes, the contemplated Cochenour-Willans' development is being followed closely in processing circles.

Process Enhances Value Of Hardwood Stands

Hardwoods, as well as softwoods, can now be used in newsprint manufacture, as a result of a new process developed by George Shipman of Donnacona Paper Co.

Mr. Shipman's process uses semi-bleached kraft chemical pulp made from birch, plus mechanical pulp made from poplar and thus makes it possible to use 40% hardwood in newsprint manufacture.

Newsprint sheets thus made are said to compare favorably in appearance and printability with newsprint made entirely from softwood.

Lignin Wastes for Road Stabilization

Although several Canadian paper mills have been interested in work to determine the value of lignin as a stabilizing material in road construction, Consolidated Paper Corp., Montreal, is one of the first concerns to place such a sulphite liquor derivative on the market. Tradenamed Copacite, the new product is recommended both for road bed preparation and as a foundry core binder component.

Numerous experiments have been conducted by government road bureaus in Eastern Canada within the past few years in which lignin extract was mixed with clay or gravel, and consolidated by means of a roller to form a firm, and semi-water repellent road base. Such consolidates were said to have about one-third the tensile and sheer strength of concrete and served as a good base for wear-resistant tar or asphalt coating.

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MARKET OUTLOOK

Broadened Mercury Use Forecast
Penicillin Supply Position Improves
Carbon Black Prospects
Casein Outlook Dark
Titania Shortage to Continue
Market Review

Mercury Consumption To Expand

There is, currently, considerable justification for the belief that mercury consumption in the U .S. will be substantially greater in the next few years than was the case prewar, but what proportion of these needs will be met by domestic production is, however, less certain, in view of the political issues involved.

At the close of the war mercury mining dropped precipitously to a 13-year low of 1200 flasks (76 lbs. each) in October. Since that time, with prices inching back from the $95.84 September low, output has risen to 1850 flasks monthly in January and February, and twelve of the fourteen mines which closed after V-J day have reopened. Thereby, the current production rate approximates 22,000 flasks per annum—well in line with the best prewar year figure which averaged 20-25,000 flasks.

Several factors have contributed to the rapid recovery of the industry. Specifically, the absorption of surplus inventories, which threatened to glut the market, the firming of prices above $100, and an unanticipated quickening of demand for the metal.

Producers and consumers seem to have differing opinions as to the future of mercury, but the weight of present arguments favors producers' optimism. A major influence may well be the midget dry cell battery developed by the Army during the War, which could alone account for 35-40,000 flasks of mercury per annum within a few years. The realization of such a demand is regarded as that distant, however, dependent upon the rapidity with which this type of battery finds a broader field of application.

A second development, too new yet to be adequately evaluated, and a potential runner-up to the bantam battery as a quicksilver outlet, is the mercury clutch for fractional horsepower motors. Each clutch, on small units such as washing machines, would require about an ounce of mercury, but clutches for motors up to 15 horsepower are now being designed.

Wider use of fluorescent lights, and mercury switches, are also expected to contribute to increased mercury consumption, additional to normal prewar outlets such as electrical rectifiers, vacuum pumps, thermometers, precision instruments, and so on. A possible curtailment in the chemical use of mercury is in prospect, as penicillin, streptomycin, and sulfa drugs gain, but a compensatory expansion is anticipated in fungicidal paints, particularly if authorities permit use of the element in household products.

Although it is fairly well established that consumption will be bolstered in the future, the status of the domestic producing industry is somewhat beclouded. Particularly, it is claimed that higher prices are required to permit maximum output—estimated at $120 to $150 per flask—in view of higher labor costs and lower ore output per manhour. Moreover, it is evident that a rise in price would attract large imports from Spain, and depress markets accordingly.

Furthermore, U. S. miners are disturbed by the knowledge that one mine, the Almaden, owned by the Spanish government, has ore some four times richer than U. S. deposits, and many other mines in the same country have ore better than the U. S. average. If modern equipment were installed at Almaden it would mean that Spain could ship mercury to this country, absorb the $19 per flask duty, and still undercut domestic producers. The fact that a representative of this organization has recently visited the U. S. to survey equipment, and to negotiate for

Market Review

Heavy Chemicals—The heavy chemical market displayed a firm tone throughout the month but turnover was rather limited in many cases due to the oversold position of a number of commodities. Prices remained steady, with job lots of potassium permanganate, caustic soda, sodium perborate and other currently scarce chemicals commanding a premium. Bichromates were difficult to obtain, and copper sulfate export shipments were held pending a settlement of the labor difficulties which have beset the producers. If copper prices are advanced, quick reflection is anticipated in sulfate quotations.

Virtually all coal tar intermediates were unobtainable, and supplies of paradichlorobenzol were non-existent, with little prospect of substantial easing in prospect for the next few months. Dyestuffs were very strong, and many producers are booked several months ahead with domestic and overseas commitments.

The outlook for solvents was further aggravated with the settlement of the G. M. strike, and the probability that automakers would soon be taking augmented quantities of butyl alcohol aud butyl acetate. Acetic acid was in fair supply, and two manufacturers reduced prices on furfuryl alcohol and isopropylamine. The former reduction amounted to 5 per cent, to bring prices to 19 cents a lb., and the latter places isopropylamine as one of the cheapest primary aliphatic amines.

Fine Chemicals—Bromides continued in ample supply, but saccharine, aminopyrine, acetalsalicylic, and thymol remained scarce and firm. Brazilian menthol prices rose slightly, but were inhibited by the news that China expects to harvest a peppermint crop this year and make late Fall menthol offerings. Mercury quotations rose several dollars, and the glycerine situation, which was expected to ease in June, was darkened by the receipt of tonnage inquiries from paint manufacturers. Proplene glycol and sodium lactate both became active as possible glycerine substitutes. Iodine and iodides were readily available, with the release of government-held stocks, but caffeine tightened. It is not anticipated that any synthetic material will be on the market for a good many months.

Agricultural Chemicals — A severe shortage of fertilizer components was manifest in keeping with the seasonal upturn in demand for complete mixtures. Fertilizer sales are rising, but supplies will not be ample to meet all needs. Transportation, manpower, and raw material deficiencies are holding back production which could otherwise easily pass 13 million tons during the fiscal year ending June 30. UNRRA is reported to have bought 5000 tons of ammonium sulfate to export, and is in the market for an additional quantity. Japan and Germany are estimated to require 347,000 and 253,000 metric tons of nitrogen respectively, part of which may be supplied by the U. S.

Some 1700 bales of pyrethrum flowers reached New York from Kenya, the first shipments direct to dealers since the war; government stocks are placed at 2000 tons. The DDT market vacillated, and although open quotations on carloads were listed as 45 cents, some buyers were understood to have obtained deliveries at 38 cents, or better.

U. S. representation, does not lack significance.

Penicillin Picture Brightens

Penicillin supplies for injection, oral, and topical applications have improved substantially during the past few months, and although CPA officials do not expect that allocation controls will be revoked before summer, the situation has eased considerably.

About 1,800,000,000,000 units of the drug will be available for allocation during April, of which approximately 300,000,000,000 units will be earmarked for export.

Penicillin production is currently breaking all records, and is double that of last autumn. Chief reasons for the bolstered output are the greater yield obtained from the better strains of penicillin-producing molds now being used, and the completion of new facilities which have been under construction since last year. Still other units are scheuled to come into operation during the summer to further boost U. S. output.

A reasonable balance between supply and demand may be established within the year, and the industry expects to achieve a fair stock position this summer, when demand tapers with the lower incidence of respiratory diseases.

This anticipation is predicated, however, on the maintenance of adequate supplies of corn steep liquor. CPA regulations are not scheduled to be revoked until penicillin reserves have been built up to a satisfactory safe level.

Carbon Black Future Secure

Despite the fact that the nation's carbon black producing facilities have trebled during wartime—soaring from 477 million pounds in 1938 to a rated capacity of 1,450 million pounds at the beginning of this year—indications are that output in 1946 will do little more than accommodate industrial needs.

Principal reason for the sustained high demand is the requirements of the tire and rubber manufacturing industry, which must use some 30 to 100 per cent more black in processing synthetic rubber than is the case in compounding the natural product. Too, although rubber processors absorb 90 per cent of black output, printing inks consume 25 million pounds a year; paints, 5 million; and other industries, 13 million. With heavy production schedules anticipated for all these industries, carbon black consumption will logically be greater in these fields, too.

While the available supply will undoubtedly meet demand, the Bureau of Mines estimates that the maintenance of a high level of black output will be required for at least the next five years. Average annual consuming needs during that period are placed at 1,140 million pounds, based on 1,234 million pounds for 1946, and smaller quantities as the synthetic-natural rubber balance changes.

Casein Supply Prospects Poor

There is very little likelihood that the supply position of casein will ease, even slightly, over the course of the year, according to trade sources. Actually, at this writing, the desirability of placing this commodity under allocation is being considered seriously.

The situation has worsened markedly since February when the OPA adopted a firm stand on price ceilings, with the thought that thereby Argentine producers would be induced to desist from withholding shipments in the expectation of higher U. S. prices. Since then, however, world demand has bid up Argentine prices to a current 27 cents—above the 24 cent U. S. ceiling. Another factor, influencing the market, is the world food crisis. In the light of the food dearth it is difficult to divert milk proteins from food channels to casein production.

Regardless of such action as may be taken by government agencies in the next few months, casein is slated to remain in tight supply. Even a resumption of trade with Argentine, which has stocks of some 13 million pounds on hand, would not change the immediate prospects, in view of domestic needs totalling some 70-75 million pounds of casein.

Prolonged Titania Shortage Expected

Government officials do not expect the supply of titanium dioxide to catch up with the demands of the paint industry for at least another five years, according to an OPA bulletin. In addition, increased calls for the pigment are anticipated from manufacturers of linoleum, artificial leathers, rubber, shoe creams, and other specialties.

Production of titanium pigments has risen remarkably in recent years, and currently stands at 120,000 tons per annum, with still higher output scheduled.

Streptomycin Output At New High

Output of streptomycin during March approximated 27,000 grams from the laboratory and pilot plant facilities of several producers. Of this total about 30 per cent was allocated to the Army, according to the War Department.

Agencies other than the Army now receiving allotments of the antibiotic are the Navy, Veterans Administration, and the U. S. Public Health Service. Limited supplies of streptomycin will be distributed to civilians through the Committee on Chemotherapeutics, Division of Medical Sciences, National Research Council.

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Naphthalene Production in U. S.

Although naphthalene has never been produced in the U. S. in quantities sufficient to meet domestic demand, overall output has been increasing steadily since World War I. In the last few years, as is evident from the accompanying graph, new production peaks have been established to lessen somewhat the nation's dependence on imports.

Prior to World War II, the U. S. occupied third place in the recovery of naphthalene, supplying about 13 per cent of the total world output. Germany, furnishing 40 per cent, was the world's leading producer, with Great Britain ranking second with 15 per cent. France, Belgium, Russia, The Netherlands, and Czechoslovakia together accounted for 27 per cent of the world output.

Even though domestic production of crude naphthalene has increased markedly in the past few years, consumption has also soared, and more than half the output has been absorbed in the manufacture of phthalic anhydride. Other uses, in order of importance, are beta naphthol, insecticides, other intermediates and chemicals, and chlorinated naphthalene.

Although bolstered demand is anticipated in the future from several of these markets, the exact supply-demand ratio cannot be precisely appraised at present, in view of the lack of information available as to European productive facilities, which formerly looked after 46 per cent of U. S. imports. Furthermore, the future of the steel industry, and of the operation of petroleum-based ortho xylene units for phthalic anhydride further complicate the naphthalene picture.

Glycerine Stocks Rise

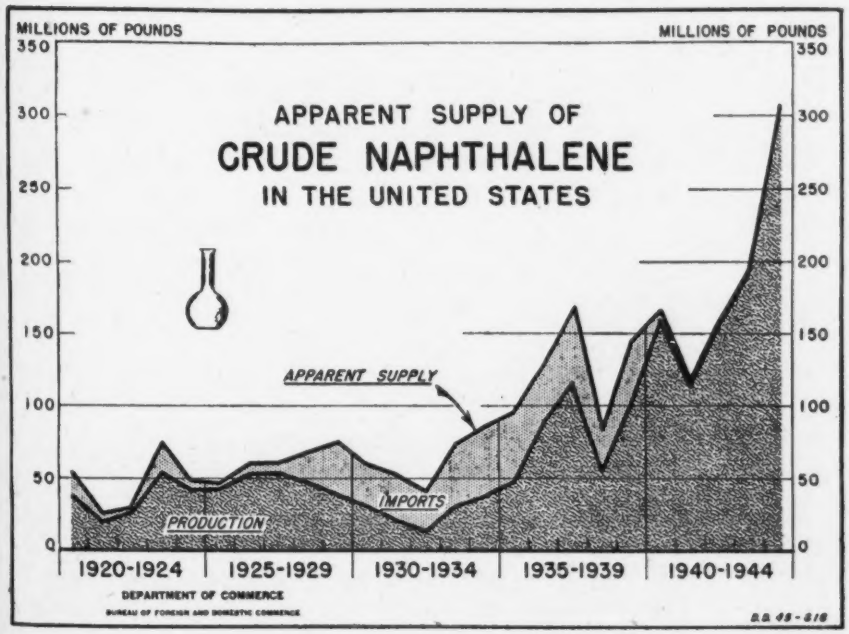
Stocks of crude glycerin increased 2,876,000 pounds in December, according to the Bureau of Census, thus marking the first gain in reserve supplies in some time.

Stocks on hand at the end of December, 1945, amounted to 45,718,000 pounds (absolute basis) in contrast to 42,842,000 pounds at the end of the preceding month, November. Production however, declined from 13,427,000 pounds in November to 11,759,000 pounds in December but there were some imports in December and because of the year-end holidays consumption was reported as somewhat under November.

Plasticizers Output Up

Figures issued recently by the U. S. Tariff Commission show that output of plasticizers in 1944 was 36 per cent more than in 1943 and 438 per cent more than in 1940, part of the war-time increase being due to the use of dimethyl phthalate as an insect repellent.

Aggregate U. S. output of phthalate plasticizers in 1944 was 116,810,000 lb., of which 47,810,000 lb. was dibutyl phthalate, 42,837,000 lb. dimethyl phthalate and 3,487,000 lb. diethyl phthalate. Production of tricresyl phosphate was 21,172,000 lb. and of dibutyl sebacate was 5,455,000 lb.



CONSUMPTION OF TURPENTINE IN U. S.

(By naval stores crop years, beginning April 1 and ending March 31)
(50 gal. bbls).

	1945-1946 3 mos. (Oct.-Dec.) Total	*1944-1945 3 mos. (Oct.-Dec.) Total*
Abattoirs	0	0
Adhesives & Plastics	52	74
Asphaltic products	0	0
Automtobiles & wagons	29	37
Chemicals & pharmaceuticals	27,647	32,909
Ester gum & synthetic resins	4,593	4,346
Foundries & foundry supplies	155	169
Furniture	49	54
Insecticides & disinfectants	4	8
Linoleum & floor covering	12	11
Matches	0	0
Oils & greases	3	117
Paint, varnish & lacquer	4,547	5,174
Paper & paper size	0	0
Printing ink	53	69
Railroads & shipyards	1,753	2,397
Rubber	52	196
Shoe polish & shoe materials	3,135	3,165
Soap	0	0
Other industries	66	46
Total industrial reported	42,150	48,772
Not accounted for[1]	76,736	71,366
Apparent U. S. consumption	118,886	120,138

[1] Principally unreported distribution of turpentine through retailers who sell in small quantities to ultimate consumers.

CONSUMPTION OF ROSIN IN U. S.

(By naval stores crop years, beginning April and ending March 31)
(Drums—520 lbs.)

	1945-1946 3 mos. (Oct.-Dec.) Total	*1944-1945 3 mos. (Oct.-Dec.) Total*
Abattoirs	113	301
Adhesives & plastics	4,719	8,867
Asphaltic products	162	448
Automobiles & wagons	39	55
Chemical & pharmaceuticals	65,691	68,362
Ester gum & synthetic resins	63,314	68,952
Foundries & foundry supplies	3,276	2,923
Furniture	0	2
Insecticides & disinfectants	1,097	1,403
Linoleum & floor covering	2,943	5,298
Matches	286	265
Oils & greases	5,605	11,384
Paint, varnish & lacquer	24,757	36,288
Paper & paper size	67,945	95,637
Printing ink	2,010	4,873
Railroads & shipyards	2,586	6,540
Rubber	3,460	5,596
Shoe polish & shoe materials	1,272	1,869
Soap	30,394	82,705
Other industries	900	1,055
Total industrial	280,569	402,823
Not accounted for[1]	31,844	−5,799
Apparent U. S. consumption	312,413	397,024

[1] The discrepancy between the total industrial consumption reported and the apparent U. S. consumption is due partly to unreported industrial consumption and partly to failure of some consumers to distinguish between gum rosin, wood rosin, and modified or derived rosins in their reports.

Organic Chemicals Register Marked Gain

A report released recently by the U. S. Tariff Commission outlines in detail the production and sales of synthetic organic chemicals in the U. S. A. in 1941-43. Contained therein are statistics hitherto withheld from publication.

Major features of the bulletin are the production figures tabulated for major groups of chemicals during the three year period. These groups, with the year of peak output bracketed, are: Tars, 931 million gals. (1942): petroleum raw materials, 1.6 billion lb. (1943): intermediates, 1.6 billion lbs. (1943): dyes, 169 million lbs. (1941): color lakes and toners, 26 million lbs. (1941): medicinals, 56 million lbs: (1943): flavor and perfume materials, 15.4 million lbs. (1942): plastics, 654 million lbs. (1943): rubber processing chemicals, 81 million lbs. (1943): miscellaneous chemicals, 8.9 billion lbs. (1943). Among intermediates and finished products, greatest gains were in materials used in military explosives, medicines, or for other war purposes.

Sales of synthetic organic chemicals also increased during this period, rising from a prewar annual average of about $330 million to over $1.4 billion in 1943.

Lead Supply Situation Critical

The supply of refined lead available for consumption continued to decrease in 1945, according to the Bureau of Mines, United States Department of the Interior. Although refinery output remained approximately unchanged, domestic mine production, Government stocks, imports of lead-bearing materials, and exports of pig lead declined in 1945. Because of a supply which was considerably below demand, the Government continued to restrict consumption. The ceiling price of 6.50 cents per pound for lead at New York remained unchanged throughout 1945, and payments under the Premium Price Plan continued to be made by the Metals Reserve Company.

Production.—Preliminary data based on reports from producers covering eleven months' actual output plus an estimate for December indicate that 477,500 short tons of refined lead and 51,600 tons of antimonial lead were produced at primary refineries in 1945. Refined lead output was virtually the same as in 1944; antimonial lead production decreased 11 per cent compared with the 1944 output. It is estimated from incomplete data that 382,000 tons were produced from domestic ores and base bullion, an indicated decline of 3 per cent from 1944, and the smallest output since 1938. The decline was largely a result of the critical shortage of manpower, particularly at the mines.

Stocks.—Producers' stocks of refined lead (table 3) increased 126 per cent according to data obtained in the Bureau of Mines preliminary annual survey of primary smelters and refineries. Inventories of antimonial lead (in terms of lead content) increased 132 per cent. Government-owned stocks within the continental United States, mostly of corroding grade, declined from 90,454 tons on January 1 to 68,700 tons on December 31, a drop of 24 per cent, according to information compiled by the Tin-Lead-Zinc Division of the Civilian Production Administration (successor November 3 to the War Production Board).

Foreign trade.—Import-export data, as reported by the Department of Commerce, have been released. Over 70 per cent of the total pig lead imported came from

CHEMICALS: UNITED STATES PRODUCTION, JANUARY 1946

Statistics on the production of chemicals shown in the following table are a continuation of the series initiated on February 7, 1944, in "Facts for Industry," Series 6-1-1. With the end of the war, the list of chemicals covered was reviewed and those presented here were selected for continuation. While considerably curtailed, this group of chemicals and gases is fairly representative of the products of the inorganic chemicals industry, and provides sufficient information for gaging the broad changes in operation from month to month. This list is subject to change if future developments indicate that additional chemicals should be covered or that certain of those on which data are now published have relatively small interest. The figures shown here represent the primary production of the various chemicals in the United States, including quantities produced for consumption in the producing plant, produced for intra-company transfer and produced for sale. Data on consumption and stocks in producing plants, included in this release through September 1944, are no longer collected.

Chemical and Basis	*Unit*	*Production*	
		January (Preliminary)	*December (Revised)*
Ammonia, synthetic anhydrous[1]	Short tons	[2]41,217	45,557
Ammonium nitrate (100% NH_4NO_3)	Short tons	37,695	39,929
Ammonium sulfate, synthetic (technical)	M pounds	[3]	16,724
Calcium arsenate (100% $Ca_3(AsO_4)_2$)	M pounds	[3]	[4]
Calcium carbide (commercial)	Short tons	45,192	41,364
Calcium phosphate:			
Monobasic (100% $CaH_4(PO_4)_2$)	M pounds	5,569	5,176
Dibasic (100% $CaHPO_4$)	M pounds	7,750	8,163
Carbon dioxide:			
Liquid and gas	M pounds	17,630	14,926
Solid (dry ice)	M pounds	38,358	36,501
Chlorine	Short tons	89,637	*94,784
Chrome green (C.P.)	M pounds	1,748	1,613
Chrome yellow and orange (C.P.)	M pounds	4,617	4,391
Copper acetoarsenite (Paris green)	M pounds	[3]	[4]
Hydrochloric acid (100% HCl)	Short tons	[2]26,799	*28,990
Hydrofluoric acid:			
Anhydrous (100% H_2F_2)	M pounds	2,204	3,053
Technical (100% H_2F_2)	M pounds		
Hydrogen	Millions of cubic feet	[2]1,405	*1,475
Lead arsenate (acid and basic)	M pounds	[2]6,229	5,514
Methanol (natural) (100% CH_3OH)	M gallons	211	236
Molybdate chrome orange (C.P.)	M pounds	464	380
Nitric acid (100% HNO_3)	Short tons	34,769	33,033
Oxygen	M cu. ft.	721,506	*890,517
Phosphoric acid (50% H_3PO_4)	Short tons	68,534	68,231
Silica gel:			
Desiccant grade	M pounds	4,059	3,981
Aviation gas catalyst grade	M pounds		
Silver nitrate (100% $AgNO_3$)	M ounces	4,152	3,647
Soda ash (commercial sodium carbonate):			
Ammonia soda process—			
Total wet and dry (98-100% Na_2CO_3)[5]	Short tons	387,012	379,786
Finished light (98-100% Na_2CO_3)[6]	Short tons	196,492	197,682
Finished dense (98-100% Na_2CO_3)	Short tons	132,339	128,643
Natural[7]	Short tons	[3]17,645	14,919
Sodium bicarbonate (refined) (100% $NaHCO_3$	Short tons	15,132	16,814
Sodium bichromate and chromate	Short tons	7,735	6,769
Sodium hydroxide (caustic soda):[8]			
Electrolytic process—			
Liquid (100% NaOH)	Short tons	85,846	*90,293
Solid (100% NaOH)	Short tons	17,757	16,549
Lime-soda process—			
Liquid (100% NaOH)	Short tons	68,427	63,102
Solid (100% NaOH)	Short tons	21,618	20,494
Sodium phosphate:			
Monobasic (100% NaH_2PO_4)	Short tons	1,244	1,180
Dibasic (100% Na_2HPO_4)	Short tons	5,727	6,094
Tribasic (100% Na_3PO_4)	Short tons	9,216	8,710
Meta (100% $NaPO_3$)	Short tons	2,272	2,538
Tetra (100% $Na_4P_2O_7$)	Short tons	4,343	4,268
Sodium silicate:			
Soluble silicate glass, liquid and solid (anhydrous)	Short tons	34,524	29,276
Sodium sulfate:			
Anhydrous (refined) (100% Na_2SO_4)	Short tons	7,864	7,205
Glauber's salt (100% $Na_2SO_4.10H_2O$)	Short tons	13,215	13,134
Salt cake (crude) (commercial)[7]	Short tons	40,360	*46,888
Sulfuric acid:			
Total (100% H_2SO_4)	Short tons	[10]716,219	*745,554
Chamber process (100% H_2SO_4)	Short tons	238,207	261,541
Contact process (100% H_2SO_4)[11]	Short tons	478,012	*484,013
Net, contact process (100% H_2SO_4)[11 12]	Short tons	432,680	*438,658
Zinc yellow (zinc chromate) (C.P.)	Short tons	[4]	12

[1] Data for a small amount of aqua ammonia are includede in the figures reported by one company.
[2] Proportion of estimate, 8 per cent or less.
[3] Not yet available.
[4] Data cannot be published without disclosing operations of individual establishments.
[5] Total wet and dry production, including quantities diverted for manufacture of caustic soda and sodium bicarbonate, and quantities processed to finished light and finished dense soda ash. For detailed discussion of soda ash statistics see "Facts for Industry," Series 6-1-1.
[6] Not including quantities converted to finished dense soda ash.
[7] Natural soda ash and crude salt cake data collected in cooperation with Bureau of Mines.
[8] Data for a small amount of trona are included in the figures reported by one company.
[9] Production figures represent total production of liquid material, including quantities evaporated to solid caustic and reported as such.
[10] Data for sulfuric acid manufactured as a by-product of smelting operations are no longer included. This production by eight plants accounted for approximately 4 per cent of the 1945 total production.
[11] Includes sulfuric acid of oleum grade.
[12] Excludes spent acid. For detailed explanation see "Facts for Industry," Series 6-1-1.
* Revised.

Prepared by the Bureau of Census.

Mexico, the remainder came from Peru, Canada, and Australia. Imports of lead in base bullion, all from Mexico, dropped to 8 tons in 1945. Receipts of lead in ore and matte, principally from Australia, Peru, Newfoundland, and Canada, declined 33 per cent. Total exports of pig lead (excluding re-exports of foreign refined lead) in 1945 dropped to 9 per cent of the 1944 total due almost entirely to the sharp decline in shipments to the Union of Soviet Socialist Republics.

Consumption.—In 1945 the calculated supply of refined lead which was made available for shipment from primary refineries to consumers (a close measure of consumption) amounted to approximately 706,900 tons, a 10 per cent decrease from the comparable figure of 786,463 tons in 1944.

Lead continued under Government control during 1945, through the provisions of the War Production Board General Preference Order M-38. In operation the order prohibited the use of lead for certain purposes and permitted all essential uses to function free of control. Several amendments were issued during the year lowering and, in some instances, raising the quotas of lead permissible for certain industrial uses.

Price.—The ceiling price for common lead at New York remained at 6.50 cents per pound throughout 1945. Subsidy payments under the Premium Price Plan for over-quota production continued to be paid to domestic mine operators.

Alcohol Consumption Reported For Last Year

The total quantity of new denatured alcohol used in the U. S. during the fiscal year ending June 30, 1945 amounted to 495,667,007 wine gallons, according to official Treasury Department returns, with recovered alcohol consumption standing at 265,839,204 wine gallons.

Consumption according to main product or use categories are as follows:

	New	*Recovered*
Solvent	30,298,511	153,420,521
Thinners	19,611,370	22,990
Toilet preparations	5,387,131	1,369
Food and drug and industrial processing	9,660,126	66,365,523
Pharmaceutical products for external use	1,308,799	428
Cleaning, preserving and flavoring preparations	1,764,766	37,898
Raw material in chemical production	425,198,280	45,931,867
Fuel	1,263,913	.....

The report contains a detailed breakdown of consumption by end use in various divisions of the broad classifications, which space does not permit publishing, but which may be obtained from the Bureau of Internal Revenue, Alcohol Tax Unit, Washington 25.

Casein Output Sags

Dry casein production in January remained at nearly the lowest level on record for the month according to estimates made by the Bureau of Agricultural Economics.

At 400,000 lbs., January production was 40 per cent less than a year earlier, and 82 per cent below the January 1940-44 average. Driers' stocks of casein in the U. S. A. were 3,590,000 lbs. on Jan. 31 compared with 3,200,000 lbs. a year earlier. Stocks on hand at the end of January were 12 per cent higher than in 1945.

A decline of 1,060,000 lbs. in stocks occurred during the month compared with a reduction of only 150,000 lbs. in the same month of last year.

War Effects Major Mineral Depletion

Bureau of Mines figures on 1945 production of minerals and mineral products list output valued at $8,067,000,000 for the year, only a 4.6 per cent decrease from 1944 despite the war's end in August.

The war has, however, cut deeply into U. S. mineral resources, and although far from depleted, an alarming situation does exist caused by the prodigious expending of more than 30 essential minerals. Usable reserves of 22 of these "blue chip" minerals are not big enough to last 35 years—a period longer than any peace America has known in the last century.

Minerals for making weapons, and war materiel, cost the U. S. $36 billion during war years and took from the earth more than six times as much as in a year of

PLASTICS AND SYNTHETIC RESINS, DECEMBER 1945

These statistics represent the shipments and consumption of plastics and synthetic resins as reported by 74 manufacturing companies and company departments. The decrease in the number of manufacturers from that shown previously is due to the exclusion from the count of companies which reported coating resins only. Data for these materials are not covered in this survey. Shipments, for the purposes of this report, include data for plastics and resins which are manufactured by the reporting companies or company divisions and shipped to outside users. Consumption refers to the quantities of plastics and resins which are manufactured and used by the reporting companies or company divisions. Statistics are available beginning June 1945; for cellulose plastic products only, data are available for earlier periods.

SHIPMENTS AND CONSUMPTION IN THE UNITED STATES, NOVEMBER AND DECEMBER 1945

Item	*Shipments and Consumption (in pounds) December 1945*	*November 1945*
Cellulose acetate and mixed ester plastics:[1]		
Sheets:		
Continuous (under .003 gauge)	438,251	568,082
Continuous (.003 gauge and upward)	375,691	645,274
All other sheets, rods and tubes	351,159	446,904
Molding and extrusion materials	5,394,508	6,171,003
Nitrocellulose plastics:[1]		
Sheets	828,232	899,082
Rods and tubes	460,780	598,550
Phenolic and other tar acid resins:		
Laminating (dry basis)	2,047,659	2,141,700
Adhesives (dry basis)	468,617	542,188
Molding materials[1]	9,378,740	9,613,359
All other (dry basis)[2]	2,866,455	2,334,605
Urea and melamine resins:		
Adhesives (dry basis)	2,167,585	*2,358,100
Textile and paper treating (dry basis)	516,983	465,466
All other (dry basis)[2]	361,677	262,124
Polystyrene[3]	2,239,477	*2,104,740
Vinyl resins:		
Sheeting and film[1]	1,325,870	*1,134,895
Textile and paper coating resins (resin content)	1,058,465	1,102,032
Molding and extrusion materials[1]	4,793,349	*4,813,627
Adhesives (resin content)	347,221	328,992
All other (resin content)[2]	525,886	478,571
Miscellaneous plastics and resins:		
Molding and extrusion materials[1, 4]	4,112,445	4,110,975
All other (dry basis)[2, 5]	1,480,227	1,891,837

* Revised.

[1] Includes filler, plasticizers and extenders.

[2] Excludes data for protective coating resins.

[3] Revised data in pounds for shipments and consumption of polystyrene resins are: October 1945, 1,953,148; September 1945, 1,909,727.

[4] Includes data for ethyl cellulose, urea and melamine, acrylic acid and miscellaneous molding and extrusion materials.

[5] Includes data for petroleum resins, acrylic acid ester resins, mixtures and miscellaneous synthetic resin materials.

PAINT, VARNISH, LACQUER AND FILLER, DECEMBER 1945 AND ANNUAL SUMMARY

The statistics presented in this release show the value of sales by 680 manufacturing establishments. These establishments accounted for approximately 90 percent of the total value of the output of this industry as reported in the Census of Manufactures for 1939. Comparable statistics for the 680 manufacturing establishments are available by months beginning with January 1936.

SALES BY 680 MANUFACTURING ESTABLISHMENTS

Year and Month 1945	*Total Sales Reported by 680 Establishments*	*Classified Sales Reported by 580 Establishments: Trade Sales of Paint, Varnish and Lacquer*	*Industrial Sales: Total*	*Industrial Sales: Paint and Varnish*	*Industrial Sales: Lacquer*	*Unclassified Sales Reported by 100 Establishments*
January	$53,660,343	$25,204,258	$23,058,028	$17,701,016	$5,357,012	$5,398,057
February	51,487,714	24,074,516	22,430,042	16,765,455	5,664,587	4,983,156
March	59,708,428	27,756,431	26,118,399	19,486,322	6,632,077	5,833,598
April	58,391,532	26,438,966	25,953,181	19,679,706	6,273,475	5,999,385
May	59,848,476	27,257,881	26,257,532	20,025,802	6,231,730	6,333,063
June	58,367,736	26,011,526	26,254,682	20,548,148	5,706,534	6,101,528
July	52,623,448	22,689,192	24,485,398	18,578,202	5,907,196	5,448,858
August	51,101,033	23,427,452	22,167,652	16,840,684	5,326,968	5,505,929
September	48,020,267	26,011,054	16,851,178	12,540,036	4,311,142	5,158,035
October	57,540,413	31,017,695	20,820,454	15,977,434	4,843,020	5,702,264
November[1]	50,297,661	26,042,952	18,996,011	14,475,336	4,520,675	5,258,698
December	42,378,090	21,462,371	16,605,089	12,128,925	4,476,164	4,310,630
Total (year)	$643,425,141	$307,394,294	$269,997,646	$204,747,066	$65,250,580	$66,033,201

[1] Revised.

normal production. Likewise, this represents more than 20 per cent of the total output during the 65 year period dating from 1880. Metals produced during the five war years were valued at $11,002,000,500; fuels, $20,748,300,000, and nonmetallic minerals, such as graphite, talc, and potash totaled $4,480,000,000.

The U. S. is now a "have not" nation in regard to copper, lead, zinc, cadmium, mercury, chromium, nickel, tin, asbestos, antimony, tungsten, gold, silver, and industrial diamonds. New information about known deposits of other minerals, changing industrial demands, and new, but more expensive, processes for using low grade ore may extend the time during which U. S. resources can fill demands, according to the Bureau of Mines, but the nation has been sorely taxed by wartime expenditures.

Ammonium Sulfate Output Shaded

Production of ammonium sulfate in by-product coke plants in 1945 was moderately below 1944, due in large part to the decline in steel mill operations following the end of the war. Since steel production this year would normally be expected to be below wartime peak level, and has been further affected by the steel strike, ammonium sulfate output for the year will be reduced substantially.

Comparative date, in the production of both the sulfate and ammonia liquor at by-product coke plants, in thousands of short tons is given below:

	Ammonium Sulfate	*Ammonia Liquor (NH_3 Content)*
1937	645	437
1938	437	22
1939	580	24
1940	718	28
1941	745	31
1942	767	34
1943	761	34
1944	818	32
1945	763	28

Streptomycin Production Increasing

Production of streptomycin, though still far short of demand, is showing a steady increase, and for January was estimated at 15,000 grams, equal to 15 billion units. No significant increases in output are expected in the next three or four months, however.

UNRRA Fertilizer Shipments

A cumulative total of 106,705 tons of fertilizer has been shipped by UNRRA through the end of 1945 to liberated areas from the Western Hemisphere, according to the monthly report of Director-General Herbert H. Lehman.

December shipments alone total 12,274 tons. Greece has been the largest recipient of fertilizers from UNRRA, the total being 36,776 tons. Poland ranked next with 26,385 tons, Yugoslavia received 24,290 tons, and the remainder, 19,254 tons, went to Czechoslovakia.

Iron Ore Production Off

Termination of war contracts, accompanied by decreases in steel production resulted in a 6 per cent drop in iron ore production in 1945, according to the Bureau of Mines, United States Department of the Interior. Decreases were apparent in all districts in 1945, but the total output (88,754,000 gross tons) was 20 per cent greater than in the record peace year, 1940.

Shipments of iron ore in 1945 decreased 7 per cent from 1944 and amounted to 88,156,000 gross tons. The estimated value of iron ore shipments in 1945 was $240,900,000 compared with $256,885,512 in 1944. The average values per gross ton were $2.73 in 1945 and $2.70 in 1944.

Production and shipments of ore containing (natural) 5 to 35 per cent manganese, not included in the iron ore statistics amounted to 1,390,000 tons and 1,445,000 tons respectively during 1945. The Lake Superior district furnished 94 per cent of production and shipments during the year.

The 5-year period 1941-45 has set an iron ore production record that is likely to stand for many years. During this period, a total of 482,000,000 gross tons of usable ore was produced at United States mines and mills.

Soap Output Declines

Due to restrictions on the amount of fats which the government allocates for the manufacture of soap, output of producers declined during 1945, according to the Association of American Soap & Glycerine Producers.

During 1945, deliveries of soap other than liquid, reported by 61 manufacturers representing approximately 90 per cent of the entire production, totaled 2,872 million pounds. This was 12.6 per cent less than in 1944. In 1946 thus far, the restrictions on fats for making soap are the same as they were at the close of 1945. Liquid soap deliveries, while small compared to other soaps, added 4,272,000 gallons to the figures for 1945.

The aggregate sales value of deliveries reported for 1945 by the manufacturers participating in the census was $405,134,000, a decline of nearly 9 per cent from the previous year.

NATIVE SULFUR IN JANUARY 1946

Production again exceeded mine shipments in January, continuing a trend begun in September 1945, according to reports of producers to the Bureau of Mines, United States Department of the Interior. Producers' stocks continued to increase and were the highest since 1944.

Production, mine shipments, apparent sales, and producers' stocks of native sulfur in the United States in selected periods, 1944-46, in long tons

Period	*Production*	*Mine shipments*	*Apparent sales**	*Producers' stocks***
January 1946	318,722	274,315	262,178	4,060,461
December 1945	331,843	208,197	244,260	4,003,917
January 1945	275,722	321,604	341,589	4,034,453
December 1944	280,580	223,268	269,882	4,100,320
Monthly average 1945	312,766	319,441	320,799	.....

* Calculated from production and change in stocks during the period.
** Producers' stocks at mines, in transit, and in warehouses at end of period.

SUPERPHOSPHATE

Production, Receipts, Disposition, and Stocks, by Type—December 1945

December 1945 statistics are based on the reports of 162 plants, of which 159 manufacture normal superphosphate, nine manufacture concentrated superphosphate and seven manufacture wet-base goods. Three plants produce concentrated superphosphate exclusively, while 159 plants produce normal material only, or normal and concentrated or normal and wet-base goods.

These statistics include data for all plants, including government owned, known to have facilities for superphosphate manufacture. All quantities are expressed in equivalent short tons of the indicated A.P.A. (available phosphoric acid) percentage content. The statistics pertain only to superphosphate as such, and include no data for superphosphate in dry-base or dry-mixed goods. Figures for receipts of material, shipments, consumption and stocks relate only to plants which actually produce superphosphate. Cases in which book figures differ from actual physical inventory are covered under the heading "Book Adjustments," the amount of book excess being indicated by a minus sign (−) and the amount of book deficit by a plus sign (+). The use of this device makes possible a full accounting of all quantities of each type of superphosphate.

* Revised.

In short tons (2000 pounds)

Item	*Normal 18% APA*	*Concentrated 45% APA*	*Wet-base goods 18% APA*
December 1945			
Stocks on hand, beginning of month	802,670	33,602	11,771
Production	593,089	23,484	4,121
Received from other acidulators (inc. exchange transfers)	9,083	.....	.....
Book adjustments (account of inventory)	−2,849	.....	+3
Total supply	1,401,993	57,086	15,895
Disposition, total	594,361	24,530	318
Shipments, total	327,280	24,330	139
Used in reporting plants	267,081	200	179
Stocks on hand, end of month	807,632	32,556	15,577
November 1945			
Stocks on hand, beginning of month	813,092	30,131	9,112
Production	651,449	24,893	4,341
Received from other acidulators (inc. exchange transfers)	9,436	.....	.....
Book adjustments (account of inventory)	+3,254	−52	−244
Total supply	1,477,231	54,972	13,209
Disposition, total	674,466	21,370	1,438
Shipments, total	399,967	21,202	278
Used in reporting plants	274,499	168	1,160
Stocks on hand, end of month	802,765	33,602	11,771

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AHCO PRODUCTS

METHYL "CELLOSOLVE"* STEARATE

METHYL "CELLOSOLVE" STEARATE, a synthetic ester, is used as a plasticizer for cellulose derivative, paper coatings and wax finishes. The following data may suggest other uses.

Chemical formula, $C_{17}H_{35}COOCH_2CH_2OCH_3$
Molecular weight 342
Color (platinum cobalt scale) 175
Melting point ..... 22° to 24°C
Flash point ..... 378°F
Acidity, less than .6 mg. KOH per gram ester
Specific gravity ..... .888 at 25°/25°C
Iodine value ..... 2 max.

Low volatility

* Trade mark of C&CCC

★

BUTYL STEARATE

BUTYL STEARATE, a synthetic ester, is used as a plasticizer for cellulose and polyvinyl derivatives, also for cosmetics, paper coatings and wax finishes. The following data may suggest other uses.

Chemical formula ..... $C_{17}H_{35}COOC_4H_9$
Molecular weight 341
Color (platinum cobalt scale) 130
Melting point ..... 19° to 20°C
Flash point ..... 358°F
Acidity, less than .6 mg. KOH per gram ester
Saponication number, 171-179 mg. KOH per gram ester
Specific gravity ..... .85-.86 at 20°/20°C
Iodine value ..... 2 max.

Low volatility

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CURRENT PRICES

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f.o.b. works are specified as such. Import chemicals are so designated.

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f.o.b., or ex-dock. Materials sold f.o.b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both.

Purchasing Power of the Dollar: 1926 Average—$1.00
March, 1944, $0.882 *March, 1945, $0.871*
March, 1946, $0.847

		Current		1946		1945	
		Low	High	Low	High	Low	High
Acetaldehyde,99%,drs.wks.	lb.	.11	.14	.11	.14	.11	.14
Acetic Anhydride, drs,	lb.	.11½	.13	.11½	.13	.11½	.13
Acetone, tks, delv.	lb.	.06	.07	.06	.07	.06	.07
ACIDS							
Acetic, 28%, bbls	100 lbs.	3.38	3.63	3.38	3.63	3.38	3.63
glacial, bbls.	100 lbs.	9.15	9.40	9.15	9.40	9.15	9.40
tks, wks.	100 lbs.	6.93	7.25	6.93	7.25	6.93	7.25
Acetylsalicylic, Standard USP	lb.	.40	.54	.40	.54	.40	.54
Benzoic, tech. bbls.	lb.	.43	.47	.43	.47	.43	.47
USP, bbls, 4,000 lbs. up	lb.	...	.54	...	.54	...	.54
Boric tech, bbls. c-l.	tons *a*	...	109.00	...	109.00	...	109.00
Chlorosulfonic, drs, wks.	lb.	.03	.04½	.03	.04½	.03	.04½
Citric, USP, crys, gran, bbls.	lb. *b*	.20	.21	.20	.21	.20	.21
Cresylic 50%, 210-215° HB, drs. wks. frt. equal	gal.	.81	.83	.81	.83	.81	.83
Formic, 85%-90% cbys.	lb.	.10	.11½	.10	.11½	.10	.11½
Hydrofluoric, 30% rubber, dms.	lbs.	.08	.09	.08	.09	.08	.09
Lactic, 22%, lgt, bbls wks	lb.	.039	.0415	.039	.0415	.039	.0415
44%, light, bbls wks	lb.	.073	.0755	.073	.0755	.073	.0755
Maleic, Anhydride, drs	lb.	.25	.26	.25	.26	.25	.26
Muriatic 18° cbys	100 lb.	1.50	2.45	1.50	2.45	1.50	2.45
20° cbys, c-l, wks.	100 lb.	...	1.75	...	1.75	...	1.75
22° cbys, c-l, wks.	100 lb.	...	2.25	...	2.25	...	2.25
Nitric,36°,cbys, wks	100 lbs. *c*	5.00	5.25	5.00	5.25	5.00	5.25
38°, c-l, cbys, wks	100 lbs. *c*	...	5.50	...	5.50	...	5.50
40°, c-l, cbys, wks	100 lbs. *c*	...	6.00	...	6.00	...	6.00
42°, c-l, cbys, wks	100 lbs. *c*	...	6.50	...	6.50	...	6.50
Oxalic, bbls, wks	lb.	.11¼	.12½	.11¼	.12½	.11¼	.12½
Phosphoric, 100 lb. cbys, USP	lb.	.10½	.13	.10½	.13	.10½	.13
Salicylic tech, bbls	lb.	.26	.42	.26	.42	.26	.42
Sulfuric, 60°, tks, wks	ton	...	13.00	...	13.00	...	13.00
66°, tks, wks	ton	...	16.50	...	16.50	...	16.50
Fuming 20% tks, wks	ton	...	19.50	...	19.50	...	19.50
Tartaric, USP, bbls	lb.	.62½	.63	.62½	.71	.70½	.71
Alcohol, Amyl (from Pentane) tks, delv	lb.	...	.131	...	.131	...	.131
Butyl, normal, syn, tks	lb.	...	.10¾	...	.10¾	...	.10¾
Denatured, CD 14, c-l drs	gal. *d*	...	.613	...	.613	...	.59
Denatured, SD, No. 1, tks.	*d*	...	.542	...	.542	...	.52
Ethyl, 190 proof tks	gal.	...	17.65½	...	17.65½	...	17.60
Isobutyl, ref'd, drs	lb.	...	.0660	...	.0660	...	.086
Isopropyl ref'd, 91%, dms	gal.	.38	.41	.38	.41	.37½	.66½
Alum, ammonia, lump, bbls. wks	100 lb.	...	4.25	...	4.25	...	4.25
Aluminum, 98-99%	100 lb.	15.00	16.00	15.00	16.00	15.00	16.00
Chloride anhyd l.c.l. wks	lb.	.09	.12	.09	.12	.08	.12
Hydrate, light, bgs.	lb.	...	.14½	...	.14½	.14½	.15
Sulfate, com'l. bgs, wks, c-l	100 lb.	1.15	1.25	1.15	1.25	1.15	1.25
Sulfate, iron-free, bgs, wks	100 lb.	1.75	2.00	1.75	2.00	1.75	2.10
Ammonia anhyd, cyl	lb.	...	.14½	...	.14½	...	.14½
Ammonia, anhyd. fert. tank cars, wks. frt. equalized	ton	...	59.00	...	59.00	...	59.00
Ammonium Carbonate, USP, lumps, dms	lb.	.08¼	.09½	.08¼	.09½	.08¼	.09¼
Chloride,whi,bbls,wks,100	lb.	4.45	5.15	4.45	5.15	4.45	5.15
Nitrate, tech. bags, wks.	lb.	.0435	.0450	.0435	.0850	.0435	.0850
Oxalate pure, grn. bbls.	lb.	...	.23	...	.23	.27	.33
Perchlorate, kgs	lb.	no stocks		no stocks		no stocks	
Phosphate, dibasic tech. bgs	lb.	.07	.07¾	.07	.07¾	.07	.08½
Stearate, anhyd. dms.	lb.	...	.34	...	.34	...	.34
Sulfate, dms, bulk	ton	28.20	29.20	28.20	29.20	28.20	29.20
Amyl Acetate (from pentane) tks., delv.	lb.	...	.14½	...	.14½	...	.15½
Aniline, Oil, drs	lb.	.11½	.12½	.11½	.12½	.11½	.12½
Anthraquinone, sub, bbls.	lb.	...	.70	...	.70	...	.70
Antimony Oxide, bgs	lb.	.15	.16	.15	.16	.15	.16
Arsenic, whi, kgs—powd.	lb.	.04	.04¾	.04	.04¾	.04	.04¾

USP $25 higher; Prices are f.o.b. N. Y., Chicago, St. Louis, deliveries ½c higher than NYC prices; *y* Price given is per gal; *c* Yellow grades 25c per 100 lbs less in each case; *d* Prices given are Eastern schedule. *a* Powdered boric acid $5 a ton higher; *b* Powdered citric acid is ½c higher.

	Current Low	Current High	1946 Low	1946 High	1945 Low	1945 High
Barium Carbonate precip, wks, bgs. ton	60.00	75.00	60.00	75.00	60.00	75.00
Chloride, tech, cyst, bgs, zone 1 ton	73.00	78.00	73.00	78.00	73.00	78.00
Barytes, floated, bbls. ton	...	36.00	...	36.00	...	36.00
Bauxite, bulk mines ton	7.00	10.00	7.00	10.00	7.00	10.00
Benzaldehyde,tech,cbys,dms lb.	.45	.55	.45	.55	.45	.55
Benzene (Benzol), 90%, tks, ft all'd gal.		.15		.15		.15
Benzyl Chloride, cbys lb.	.20	.21	.20	.24	.22	.24
Beta-Naphthol, tech, bbls, wks ton	.23	.24	.23	.24	.23	.24
Bismuth metal, ton lots lb.	...	1.25	...	1.25	...	1.25
Blanc Fixe, 66⅔% Pulp, bbls, wks ton *h*	40.00	46.50	40.00	46.50	40.00	46.50
Bleaching Powder, wks,100 lb.	2.50	3.10	2.50	3.60	2.50	3.60
Borax, tech, c-l, bgs ton *i*	...	45.00	...	45.00	...	45.00
Bordeaux Mixture, drs lb.	.11	.11½	.11	.11½	.11	.11½
Bromine, cases lb.	.21	.23	.21	.23	.21	.30
Butyl, acetate, norm. drs lb.	19.30	19.80	18.60	19.80	17.90	19.45
Cadmium Metal lb.	.90	.95	.90	.95	.90	.95
Calcium, Acetate, bgs, 100 lb.	3.00	4.00	3.00	4.00	3.00	4.00
Carbide, drs ton	50.00	90.00	50.00	90.00	50.00	95.00
Carbonate, c-l bgs ton	18.00	22.00	18.00	22.00	18.00	22.00
Chloride, flake, bgs c-l ton	18.50	35.00	18.50	35.00	18.50	35.00
Solid, 73-75⅔ drs, c-l, ton	18.00	34.50	18.00	34.50	18.00	34.00
Gluconate, U.S.P., drs. lb.	.57	.59	.57	.59	.57	.59
Phosphate, tri, bbls, cl lb.	...	.0635	...	.0635	...	.0635
Camphor, U.S.P., gran, powd, bbls lb.	.69	.71	.69	.71	.69	.71
Carbon Bisulfide, 55-gal drs lb.	.05	.05¾	.05	.05¾	.05	.05¾
Dioxide, cyl lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, Zone 1, 52½ gal. drms gal.	.73	.80	.73	.80	.73	.80
Casein, Acid Precip, bgs, 100 or more lb.	...	.24	...	.24	...	.24
Chlorine, cyls, lcl, wks, contract lb.	...	.07¼	...	.07¼	...	.07¼
cyls, c-l, contract lb. *j*	...	.05¼	...	.05¼	...	.05¼
Liq. tk, wks, contract 100 lb.	...	1.75	...	1.75	...	1.75
Chloroform, tech, drs lb.	.20	.23	.20	.23	.20	.23
Coal tar, bbls, crude bbl.	8.25	8.75	8.25	8.75	8.25	8.75
Cobalt, Acetate, bbl lb.	...	.83¾	...	.83¾	...	.83¾
Oxide, black kgs lb.	...	1.84	...	1.84	...	1.84
Copper, metal 100 lb.	12.00	12.50	12.00	12.50	12.00	12.50
Carbonate, 52-54%, bbls. lb.	.19½	.20½	.19½	.20½	.19½	.20½
Sulfate, bgs, wks cryst. 100 lb.	5.00	5.50	5.00	5.50	5.00	5.50
Copperas, bulk, c-l, wks ton	...	14.00	...	14.00	...	14.00
Cresol, USP, drs lb.	.10¾	.11¾	.10¾	.11¾	.10¾	.11¾
Cyanamid, bgs ton	1.52½	1.62½	1.52½	1.62½	1.52½	1.62½
Dibutylamine, c-l, drs, wks,		.66		.66		.66
Dibutylphthalate, drs lb.	.1720	.2359	.1720	.2359	.1770	.2359
Diethylaniline, lb drs lb.		.40		.40		.40
Diethyleneglycol, drs, wks lb.	.14	.15	.14	.15	.14	.15½
Dimethylaniline, dms,cl.,lcl lb.	.21	.22	.21	.22	.23	.24
Dimethyl phthalate, drs lb.	.20	.20½	.20	.20½	.20	.20½
Dinitrobenzene, bbls lb.		.18		.18		.18
Dinitrochlorobenzene, dms lb.		.14		.14		.14
Dinitrophenol, bbls lb.		.22		.22		.22
Dinitrotoluene, dms lb.		.18		.18		.18
Diphenyl, bbls lcl. wks. lb.	.16	.20	.16	.20	.16	.20
Diphenylamine bbls lb.		.25		.25		.25
Diphenylguanidine, drs lb.	.35	.37	.35	.37	.35	.37
Ethyl Acetate, tks, frt all'd lb.	.0975	.1175	.0975	.1175	.0975	.1175
Chloride, drs lb.	.18	.20	.18	.20	.18	.20
Ethylene Dichloride, lcl. wks, E. Rockies, dms lb.	.0891	.0941	.0842	.0941	.0842	.0941
Glycol, dms, cl. lb.	...	.10	...	.10		.10
Fluorspar, No. 1, grd.95-98% bulk, cl-mines ton		37.00	...	37.00		37.00
Formaldehyde, bbls, cl & lcl lb.	.0520	.0570	.0520	.0570	.0520	.0570
Furfural tech, dms, c-l,wks lb.	...	.13		.13		.13
Fusel Oil, ref'd, dms, dlvd lb.	.18½	.19½	.18½	.19½	.18½	.19½
Glauber's Salt, Cryst, c-l, bgs, bbls, wks 100 lb.	1.05	1.45	1.05	1.45	1.05	1.45
Glycerine dynamite, dms, c-l, lb.	.17½	.18¼	.17½	.18¼	...	.16½
Crude Saponification, 80% to refiners tks lbs.		.11½	...	.11	.09½	.11½

GUMS

Gum Arabic, amber sorts bgs lb.	.12	.12½	.11¾	.14	.11	.13
Benzoin Sumatra, CS lb.	.52	1.00	.52	1.00	.52	1.00
Copal, Congo lb.		.55¾	...	.55¾	...	.55¾
Copal, East India, chips lb.		.53¼	...	.53¼	...	.53¼
Macassar dust lb.		.07⅛	...	.07⅛	...	.07⅛
Copal Manila,	.13½	.15½	.13½	.15½	.13½	.15½
Copal Pontianak, bold c-l lb.		.17⅜	...	.17⅜	...	.23⅜
Karaya, bbls, bxs, dms. lb.	.18	.46	.18	.46	.15	.46

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

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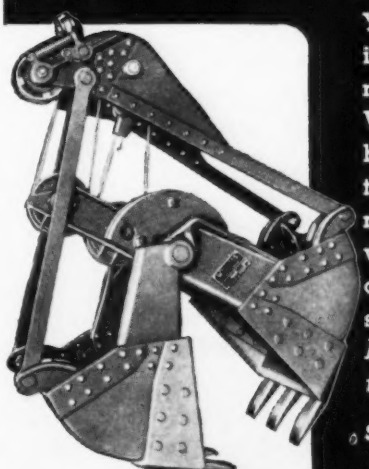

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		Current Low	Current High	1946 Low	1946 High	1945 Low	1945 High
Kauri, N. Y.							
Superior Pale XXX	lb.	...	.65¾	...	.65¾	...	.65¾
No. 3	lb.	...	.22	...	.22	...	.22
Sandarac, cs	lb.	.97½	.99½	.97½	.99½	...	.99½
Tragacanth, No 1, cases	lb.	3.80	3.90	3.80	3.90	3.80	5.00
No. 3	lb.	2.15	2.60	2.15	2.60	2.15	3.00
Yacca, bgs	lb.	.06	.07¼	.06	.07¼	.06	.07¼
Hydrogen Peroxide, cbys	lb.	.15½	.18½	.15½	.18½	.15½	.18½
Iodine, Resublimed, jars	lb.	1.75	1.85	1.75	1.85	1.75	2.10
Lead Acetate, cryst, bbls.	lb.	...	.12½	...	.12½	...	.12½
Arsenate basic, bg, lcl	lb.	.12	.12½	...	.12	.11½	.12
Nitrate, bbls.	lb.	...	.12½	...	.12½	...	.12½
Red, dry, 95% Pb_3O_4 bbls.	lb.	.09	.10¾	.09	.10¾	.09	.10¾
97% Pb_3O_4, bbls delv.	lb.	.09½	.11	.09½	.11	.09¼	.11
98% Pb_3O_4, bbls delv.	lb.	.09½	.11¼	.09½	.11¼	.09½	.11¼
White, bbls	lb.	.08¼	.08¾	.08¼	.08¾	.08¼	.08¾
Basic sulfate, bbls, lcl	lb.	.07¼	.08	.07¼	.08	.07¼	.08
Lime, Chem., wks, bulk	ton	6.50	9.25	6.50	9.25	6.25	13.00
Hydrated, f.o.b. wks	ton	8.50	12.00	8.50	12.00	8.50	16.00
Litharge, coml, delv. bbls.	lb.	.08	.09¾	.08	.09¾	.08	.09¾
Lithopone, ordi., bgs	lb.	.04¼	.04½	.04¼	.04¾	.04¼	.04¾
Magnesium Carb, tech, wks	lb.	.07¼	.10¾	.07¼	.10¾	.06¼	.10¾
Chloride flake, bbls, wks c-l	ton	...	32.00	...	32.00	...	32.00
Manganese, Chloride, Anhyd. bbls	lb.	.15	.18	.15	.18	.15	.18
Dioxide, Caucasian bgs, lcl	ton	74.75	79.75	74.75	79.75	74.00	79.75
Methanol, pure, nat, drs gal *l*		.63	.73	.63	.73	.63	.76
Synth, drs cl gal. *m*		.24	.38	.24	.38	.31	.38
Methyl Acetate, tech tks	lb.	.06	.07	.06	.07	.06	.07
C.P. 97-99%, tks, delv	lb.	.09½	.10½	.09½	.10½	.09½	.10½
Chloride, cyl	lb.	.32	.40	.32	.40	.32	.40
Ethyl Ketone,tks,frt all'd	lb.	...	.08	...	.08	...	.08
Naphtha, Solvent, tks	gal.	...	.27	...	.27	...	.27
Naphthalene, crude, 74°, wks tks	lb.	...	.0275	...	.0275	...	.0275
Nickel Salt, bbls, NY	lb.	.13	.13½	.13	.13½	.13	.13½
Nitre Cake, blk	ton	...	16.00	...	16.00	...	16.00
Nitrobenzene, drs, wks	lb.	.08	.09	.08	.09	.08	.09
Orthoanisidine, bbls	lb.	...	.70	...	.70	...	.70
Orthochlorophenol, drs	lb.	.25	.27	.25	.27	.25	.27
Orthodichlorobenzene, drms	lb.	.07	.08	.07	.08	.07	.08
Orthonitrochlorobenzene, wks	lb.	.15	.18	.15	.18	.15	.18
Orthonitrotoluene, wks, dms	lb.	...	.09	...	.09	...	.09
Paraldehyde, 98%, wks lcl.	lb.	...	.12	...	.12	...	.12
Chlorophenol, drs	lb.	.24	.27	.24	.27	.25	.32
Dichlorobenzene, wks	lb.	.11	.15	.11	.15	.11	.15
Formaldehyde, drs, wks	lb.	.21	.22	.21	.22	.21	.22
Nitroaniline, wks, kgs	lb.	.41	.43	.41	.45	.43	.45
Nitrochlorobenzene, wks	lb.	...	.15	...	.15	...	.15
Toluenesulfonamide, bbls	lb.	...	.70	...	.70	...	.70
Toluidine, bls, wks	lb.	...	.48	...	.48	...	.48
Penicillin, ampules per 100,000 units		.55	.95	.55	.95	.59	2.40
Pentaerythritol, tech	lb.	.27	.31	.27	.31	.27	.33

PETROLEUM SOLVENTS AND DILUENTS

Lacquer diluents, tks, East Coast	gal.	...	.11½	...	.11½	...	.11
Naphtha, V.M.P., East tks, wks	gal.	...	.11	...	.11	...	.11
Rubber solvents, East, tks, wks	gal.	...	.11	...	.11	...	.11
Stoddard Solvents, East, tks, wks	gal.	...	.10	...	.10	...	.10

Phenol, U.S.P., drs	lb.	.10½	.11¼	.10½	.11¼	.10½	.11¼
Phthalic Anhydride, cl and lcl, wks	lb.	.13	.14	.13	.14	.13	.14
Potash, Caustics, 88-92%, wks, sol.	lb.	.06¼	.06¾	.06¼	.06¾	.06¼	.06¾
flake, 88-92%	lb.	.07	.07½	.07	.07½	.07	.07½
liquid, 45% basis, tks	lb.	...	.02⅞	...	.02⅞	...	.0275
dms, wks	lb.	.03¼	.03½	.03	.03½	.03	.03½
Carbonate, hydrated 83-85%	lb.	...	.05½	...	.05½	.05½	.05¾
Chlorate crys, bgs, wks	lb.	.11	.13	.11	.13	.11	.13
Chloride, crys, tech, bgs, kgs	lb.	.08	nom.	.08	nom.	.08	nom.
Cyanide, drs, wks	lb.	...	.55	...	.55	...	.55
Iodide, bots., or cans	lb.	1.44	1.48	1.44	1.48	1.44	1.48
Muriatic dom, 60-62-63% K_2O bulk unit-ton	ton	...	.53½	...	.53½	.53½	.56
Permanganate, USP, wks dms	lb.	.20½	.21	.20½	.21	.20½	.21
Sulfate, 90%, basis, bgs	ton	...	36.25	...	36.25	...	36.25
Propane, group 3, tks	gal.	...	.03¾	...	.03¾	...	.03¾
Pyridine, ref., drms	lb.	.45	.45½	.45	.45½	.45½	.46
R Salt, 250 lb bbls, wks	lb.	...	.65	...	.65	...	.65
Resorcinol, tech, drms, wks	lb.	.64	.74	.64	.74	.64	.75
Rochelle Salt, cryst	lb.	.38½	.42	.38½	.47	.43½	.47
Salt Cake, dom, blk wks	ton	...	15.00	...	15.00	...	15.00

l Producers of natural methanol divided into two groups and prices vary for these two divisions; *m* Country is divided in 4 zones, prices varying by zone.

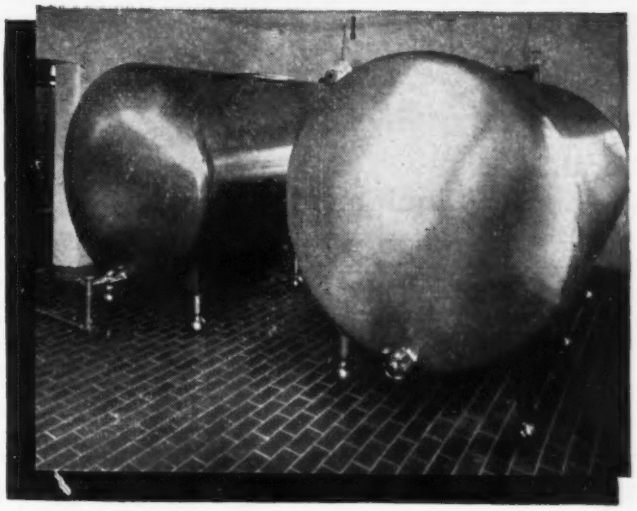
* Spot price is ½c higher.

	Current Low	Current High	1946 Low	1946 High	1945 Low	1945 High
Saltpeter, grn, bbls. . .100 lb.	8.20	8.60	8.20	8.60	8.20	8.60
Shellac, Bone dry, bbls. .lb. r	.42½	.46	.42½	.46	.42½	.46
Silver Nitrate, 100 oz, bots						
2,500-oz. lots .....oz.	.47	.47¾	.47	.47¾	.47	.47¾
Soda Ash, 58% dense, bgs,						
c-l, wks .....100 lb.	...	1.15	...	1.15	...	1.15
58% light, bgs cl. . .100 lb.	1.05	1.18	1.05	1.18	1.05	1.13
Caustic, 76% flake						
drms, cl .....100 lb.	...	2.70	...	2.70	...	2.70
76% solid, drms,cl 100 lb.	...	2.30	...	2.30	...	2.30
Liquid, 47-49%, sellers,						
tks .....100 lb.	...	1.95	...	1.95	...	1.95
Sodium Acetate, anhyd.						
dms .....lb.	.08½	.10	.08½	.10	.08½	.10
Benzoate, USP dms . . .lb.	.46	.52	.46	.52	.46	.52
Bicarb, tech., bgs., cl.,						
works .....100 lb.	1.55	1.90	1.55	1.90	1.55	1.90
Bichromate, bgs,wks l.c.l. lb.	.07⅞	.08⅛	.07⅞	.08⅛	.07½	.08⅛
Bisulfite powd, bbls, wks						
.....100 lb.	3.00	3.60	3.00	3.60	3.00	3.60
35° bb's., wks .....100 lb.	1.40	1.65	1.40	1.65	1.40	1.65
Chlorate, kgs, wks c.l. . . lb.	...	.06½	...	.06¼	...	.06¼
Cyanide, 96-98%, wks . .lb.	.14½	.15	.14½	.15	.14½	.15
Fluoride, 95%, bbls, wks lb.	.07¼	.08¼	.07¼	.08¼	.07¼	.08¼
Hyposulfite, cryst, bgs, cl,						
wks .....100 lb.	...	2.25	...	2.25	...	2.25
Metasilicate, gran, bbl, wks						
c-l .....lb.	...	2.50	...	2.50	...	2.50
Nitrate, imp, bgs .....ton	...	33.00	...	33.00	...	33.00
Nitrite, 96-98% bbl. cl. lb.	...	.06¾	...	.06¾	...	.06¾
Phosphate, di anhyd. bgs.						
wks. .....100 lb.	6.00	6.75	6.00	6.75	6.00	7.25
Tri-bgs, cryst, wks 100 lb.	2.70	3.10	2.70	3.10	2.70	3.45
Prussiate, yel, bbls. wks lb.	...	.11	...	.11	...	.11
Silicate, 52°, drs, wks 100 lb.	1.40	1.80	1.40	1.80	1.40	1.80
40°, drs, wks, c-l 100 lb.	...	.80	...	.80	...	.80
Silicofluoride, bbls NY . lb.	.06½	.10	.06½	.10	.06½	.10
Sulfate tech. Anhyd. bgs						
.....100 lb.	1.70	2.20	1.70	2.20	1.70	2.20
Sulfide, cryst c-l, bbls, wks						
.....100 lb.	...	2.40	...	2.40	...	2.40
Solid, bbls, wks .....lb.	3.15	3.90	3.15	3.90	3.15	3.90
Starch, Corn, Pearl, bgs						
.....100 lb.	...	4.08	...	4.08	...	4.08
Potato, bgs, cl .....lb.	...	.0637	...	.0637	...	.0637
Rice, bgs .....lb.	no stocks		no stocks		no stocks	
Sweet Potato, bgs .....lb.	no stocks		no stocks		no stocks	
Sulfur, crude, mines . . .ton	...	16.00	...	16.00	...	16.00
Flour, USP, precp, bbls,						
kgs .....lb.	.18	.30	.18	.30	.18	.30
Roll, bbls .....100 lb.	2.40	2.90	2.40	2.90	2.40	2.90
Sulfur Dioxide, liquid, cyl lb.	.07	.08	.07	.08	.07	.09
tks, wks .....lb.	...	.04	...	.04		.04
Talc, crude, c-l, NY . . .ton	...	13.00	...	13.00		13.00
Ref'd, c-l, NY .....ton	13.00	21.00	13.00	21.00	13.00	21.00
Tin, crystals, bbls, wks. . .lb.	no stocks		no stocks		no stocks	
Metal .....lb.	...	.52	...	.52	...	.52
Toluol, drs, wks .....gal.	...	.32	...	.32		.33
tks, frt all'd .....gal.	...	.27	...	.27		.28
Tributyl Phosphate, dms lcl,						
frt all'd .....lb.	...	.49	...	.49		.47
Trichloroethylene,dms,wks lb.	.08	.09	.08	.09	.08	.09
Tricresyl phosphate tks . . lb.	...	.24	...	.24	...	.24
Triethylene glycol, dms. . . .lb.	.18½	.19½	.18½	.19½	.18½	.19½
Triphenyl Phos, bbls .....lb.	.31	.32	.26	.32	.26	.31
Urea, pure, cases .....lb.	...	.12	...	.12		.12
Wax, Bayberry, bgs .....lb.	no stocks		no stocks		no stocks	
Bees, bleached, cakes. . .lb.	.62	.65	.60	.65	no stocks	
Candelilla, bgs crude . .ton	.72	.74	.62	.74	.35	.36
Carnauba No. 1, yellow,						
bgs, ton .....lb.	no stocks		no stocks		no stocks	
Xylol, Indus. frt all'd, tks,						
wks .....gal.		.26		.26		.27
Zinc Chloride tech fused, wks						
.....lb.	.05	.0535	.05	.0535	.05	.0535
Oxide, Amer, bgs, wks . lb.	.07¼	.07½	.07	.07½	.07	.07½
Sulfate, crys, bgs. . .100 lb.	3.40	4.15	3.40	4.15	3.40	4.15

OILS AND FATS

Babassu, tks, futures .....lb.	...	.111	...	.111	...	.111
Castor, No. 3, bbls .....lb.	.13¾	.15½	.13¾	.15½	.13¾	.14⅛
China Wood, drs, spot NY lb.	.39	.41	.39	.41	.39	.41
Coconut, edible, drs NY. . .lb.	...	.0985	...	.0985	...	.0985
Cod Newfoundland, dms. . gal.	.88	.90	.88	.90	.85	.90
Corn, crude, tks, wks . . . .lb.	...	.12¾	...	.12¾	...	.12¾
Linseed, Raw, dms, c-l . . .lb.	...	.1550	...	.1550	...	.1550
Menhaden, tks .....lb.	...	.1225	...	.1225	...	.1225
Light, pressed, drs l.c.l lb.	...	.1300	...	.1300	...	.1300
Palm, Niger, dms .....lb.	...	.0865	...	.0865	...	.0865
Peanut, crude, tks, f.o.b. wks						
.....lb.	.12⅞	.13⅛	.12⅞	.13⅛	.12⅞	.13⅛
Perilla, crude dms, NY . .lb.	no stocks		no stocks		no stocks	
Rapeseed, New Orleans,						
bulks .....lb.		.1156½		.1156½		.1156½
Red, dms .....lb.	.13¼	.14¼	.13¼	.14¼	.12¼	.14¼
Soy Bean, crude, tks, wks lb.		.1175	...	.1175		.1175
Tallow, acidless, bbls . . .lb.	...	.14¼	...	.14¼		.14¼

r Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 2c; Philadelphia deliveries f.o.b. N. Y., refined 6c higher in each case.



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UNION Rebuilt Machinery Established 1912

SPECIALS
Just Received!

UNION Rebuilt Machinery Established 1912

Micro Pulverizers 24", Model 4 TH, with magnetic starter and motor driven feeder with motor. 4 years old.
Micro Pulverizers 8" size with special discharge chute.
Enamel lined Vacuum Pans with Agitator 32" diameter.
Copper Vacuum Pans with Agitators 4 ft., 5 ft., 6 ft.
Steel Vacuum Pans with agitators 4 ft.
Centrifugal 40" with copper Basket and 40 HP 220 V 60 cycle, 3 phase motor with drum control and brake.
Longitudinal Mixer 5,000 lb. cap. with spiral agitator.
National 9 ft. dia. Chaser, 2 Roll.
Shriver Filter Press, Plate and Frame Open Delivery Type.
Smith Vail Filter Press, Recess Type, Closed Delivery.
Karl Keifer Visco Filler.

All Machines Are Offered Subject to Prior Sale

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Tablet Machines

Over 100 Stokes and Colton Rotary and Single Punch Tablet Presses—all sizes.

Miscellaneous

4 Copper and Alum. Vac. Pans
1 Pfaudler Glass-lined Jacketed Evaporating Pan, 60"x24", agitated
14 Heavy Duty Jacketed, Agitated 1000-gal. Kettles or Digesters or Cookers
9 Same as above but 100 gal., 34"x34"
5 Jacketed Autoclaves or Pressure Vessels, 4'x6'
3 Horizontal Retorts, each with 2 crates, 42"x102"
3 Ft. Wayne Sterilizers, 72-case capacity
1 Anderson, Fred Goat Gelatin Packaging Machine, automatic
1 Ball & Jewell No. 1 Rotary Cutter

Mills

1 Thropp Rubber Mill, 15"x36", arr. for motor drive
3 Raymond IMP Mills No. 45, with accessories
1 Raymond IMP Mill, 24", with accessories
1 Mitts Merrill Hog or Shredder, Model 3 D.
7 Hardinge Conical Mills, from 36" dia. to 8'
1 Day 12"x32" 3-roll (all watercooled) Mill with motor
2 Mikro Pulverizers, Bantam and No. 1

Filter Presses and Filters

5 Shriver Cast Iron Pl. & Fr. Filter Presses, from 7" to 36"
2 Sweetland Filters No. 7 (Bakelite-lined), No. 10 (lead-lined)
2 Louisville 36" Continuous Filters
1 Adams Water Filters, 1000 GPM, for large systems
1 Industrial Rotary Vacuum Filter, 6' dia. x 3' face

Presses: Hydraulic and Others

1 Standard Automatic 50-ton Plastic Molding Press with accessories
1 Farquahr 100-ton Extrusion Press, 10"x38½", stroke 40"
1 Southwark 500-ton Curb Press, 40" bed, 18" ram
1 Bethlehem 2000-ton Hydraulic Press, 8 heated plates, 5'6"x8'9"
1 Wood 7500-ton Hydraulic Press, 54" cylinder, 30" stroke, daylight 54"

4 Heavy duty, 1000 gal. copper tanks.

Dryers

1 Black & Clawson Double Drum Dryer, 28"x 60", with accessories
3 Double Drum Atmospheric Dryers, 27½"x63"
1 Devine Double Bronze Drum Dryer, 3'x9', with 25 H.P. Motor
1 Buffalo Double Drum Dryer, 32"x72"
1 Buffalo Single Drum chrome-plated Dryer, 5'x6', with auxiliaries
2 Buffalo Rotary Vacuum Dryers, 5'x30'
2 Vacuum Drum Dryers, 48"x40" (1 iron, other bronze, chromed)
1 Buffalo Vacuum Drum Dryer, 5'x20'
1 Rotary Vacuum Dryer, 3'x18', with auxiliaries
2 Galland & Henning Steam Tube Dryers, 6'x30'
1 Ruggles-Cole Rotary Dryer, 4'x20', with auxiliaries
1 Rogers Spray Dryer, 28' diameter chamber, complete
1 Proctor & Schwartz 3 Pass Apron Dryer, 41' long
1 Ross 4 Pass Continuous Conveyor Dryer, 60' long, with accessories
1 Proctor & Schwartz Tray (400) Dryer, 15' long (Louvre Type), accessories
1 Buflovak Jktd. & Agtd. 5' Pan Dryer Dryer
1 Bartlett & Snow Jktd. & Agtd. Pan

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9—Direct heat ROTARY DRYERS 4' x 30', 5' x 30, 70" x 30', 6 x 60'.

5—ROTARY KILNS, 6' x 60', 8' x 126', 8' x 135'

10—ROTARY VACUUM DRYERS; 3—Buffalo 5' x 20'; 3—Devine 4' x 25'; 1—Devine 4' x 30'; 1—Struthers Wells 30" x 12'.

1—8' x 30" Hardinge Conical Silex Lined PEBBLE MILL, also 6' x 36".

1—5' x 13' PEBBLE or TUBE MILL, with open trunnions.

1—World automatic rotary LABELER m. d.

1—1000 gal. lead-lined closed TANK, lead coils.

1—500 gal. jack. agit. AUTOCLAVE, steel hammer welded construction 200 lb. jack. press. 550 lb. internal press.

1—Komarek - Greaves BRIQUETTE PRESS, with 2-32" x 24" face, rolls for egg-shaped briquettes, rated 25 tons per hour.

1—2500 lb. Horizontal Steel Dry POWDER MIXER, spiral agitator.

2—No. 0 Raymond Beater type Pulverizers, each equipped with air classifier, exhauster, cyclone collector, tubular dust collector and inter-connecting piping.

5—B. & C. 28" Dia. x 60" face Atmospheric Double Drum Dryers, complete.

2—Atmospheric TRUCK DRYERS—each has 4 trucks, each truck holds 40 trays, 1,280 sq. ft. tray surface per dryer. Equipped with trays, heating coils, fans, etc.

1—32" x 72" BUFLOVAK ATMOSPHERIC DOUBLE DRUM DRYER, m.d.

1—Devine 3' x 9' Bronze Double Drum ROTARY VACUUM DRYER, complete with all auxiliaries.

1—4-roll RAYMOND HIGH SIDE MILL, equipped for vacuum air separation, including exhauster, cyclone collector and inter-connecting piping.

1—YORK 49 ton AIR CONDITIONING UNIT with 60 HP motor.

1—5' x 36" Hardinge Conical Ball Mill with iron lining. Hardinge air classifier, constant weight feeder, cyclone collectors, dust collector, piping, etc.

4—Sets of Farrel-Bacon Crushing Rolls, 10 x 20 and 14 x 20.

1—4' x 20' Rotary Kiln, brick lined, full drive and oil firing equipment.

1—Pangborn #56 Type CJ Dust Collector, 4480 sq. ft., 15,000 CFM. Outside steel enclosed type.

40—New 250 gallon Aluminum Tanks.

1—Albright-hell 4' x 9' Lard Roll.

1—Devine Vacuum Shelf Dryer, 10 shelves 40 x 42".

3—Day 15 gal. Pony Mixers.

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1—Triple Effect Evaporator, 1850 sq. ft. per effect. Copper Tubes
1—Zaremba Multi-Circular Evaporator Unit, 25 tons caustic soda
1—Buflovak 24" x 20" Vacuum Drum Dryer
1—Walters 5' Copper Jacketed, Agitated Kettle, 700 gal.
3—Powder Mixers, 1000 to 3000 lb.
1—Allis Chalmers 20" x 10" Jaw Crusher
1—Raymond 5 Roll Mill, with motors
1—16" Troughing Belt Conveyor, 175'
1—6' x 60' Rotary Dryer or Kiln
1—American 6' dia. 2 Disc Rotary Filter
8—Sperry, Shriver Cast Iron Filter Presses, 12" to 36" square
2—6' x 27'5" Rotary Steam Tube Dryers
1—Sperry 24" x 24" Rubber Filter Press
5—Stokes Rotary Vacuum Dryers, 4' x 10', 3' x 12', 4' x 15', 5' x 33'
1—Devine 5' x 10' Jacketed Steel Ball Mill.
6—Oliver 8' x 6' Stainless Steel Rotary Continuous Filters. NEW.
1—Buffalo 5' x 6' Atmospheric Drum Dryer
1—Sweetland No. 2 Filter
5—Copper Vacuum Pans, 30" to 6' dia.
5—Readco 100 gal. Jacketed Double Arm Mixers
3—Hardinge Mills 2' x 8", 4½' x 16", 4½' x 24"
3—Sharples No. 6 Centrifuges
3—DeLaval No. 600 and 700 Clarifiers
6—Tolhurst Centrifugals, 32" to 48"
2—Swenson Continuous Crystallizers, 24" x 30'
2—1750 gal. Lead Lined Closed Tanks

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1—STOKES #90 Automatic Tube Filler, Closer and Crimper
3—New Stainless Steel Jacketed Kettles, 75 and 100 gal. capacity
7—New Stainless Steel Tanks, 100 gal.
3—STOKES Rotary "B" Tablet Machines
2—SHARPLES Super Centrifuges M.D.
1—BLAW-KNOX S.S. Drum Dryer

Send for Bulletin A-5

What have you For Sale?

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GRamercy 5-6680

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50—300 Gal. Pfaudler Glass-Lined Tanks, with cover, mounted on supports.

Box 2096

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100—Box & Gondola Cars
128—10,000 & 8,000 gal. Tank Cars
2—2000 to 4000-gal. Emulsion Colloid Mills
6-100-150 & 200 H.P. Diesel Units
343 KW 3/60/2300 F. M. Diesel
480 KW 2300 V Diesel Generator
Raymond No. 0 Automatic Pulverizer
5' x 33' Steam Jacketed Vacuum Dryer
8—3 x 4 and 4 x 7 Hummer Screens
3 x 30, 3½ x 24, 5½ x 60, 6 x 40 and 6 x 59 Direct Heat Dryers
18 x 36 & 42 x 10 Acme Jaw Crushers
4—6½ ft. x 66 ft. Steam Cylinders, quick opening doors
20 H. P. Charlotte 1½ in. Colloid Mill
1 yd. P. & H. 50' Boom Cat. Crane

STORAGE TANKS

14—10,000, 15,000, 20,000 and 26,000-gal. Cap. Horizontal and Vertical

AIR COMPRESSORS

Electric—540, 676, 1,000 and 1,578 ft.
Diesel—360, 500, 700 and 1,000 ft.

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60 East 42nd St. — New York, N. Y.

AUTOCLAVES

1—55 Gal Blaw-Knox Stainless Steel Rotating, Jacketed, 750 lbs. Working Pressure with Reducer & Motor.
1—42" dia. x 24'-4" Vertical, Forge Welded Steel, 600 lbs. Pressure—1300 gals.
1—4' x 6' Vertical, Iron Body, Steel Jacketed, 200 lbs. Pressure—600 gals.
1—6' x 15' Vertical Steel, Jacketed, 125 lbs. Pressure—3400 gals.
1—10' x 25' Vertical or Horizontal, Forge Welded Steel, Jacketed, 100 lbs. Pressure.

AGITATOR DRIVES

1—D.O. James—Size 1300 Vertical Worm Gear, Ratio 82 to 1, with base plate for 5 H.P. motor drive.
1—General Electric Vertical Gear Reduction Output Speed 5 R.P.M.—7½ H.P. G.E. Motor—Totally Enclosed—220 volts—3 phase—60 cycle.

CONDENSERS

1—Goubert Iron Body Condenser, 1¼" Brass Tubing, 330 sq. ft. Surface
1—Devine Unit Surface Condenser, ⅜" Copper Tubing, 120 sq. ft. Surface.
1—All Copper Condenser, 1¼" Tubing, 300 sq. ft. Surface.

CRYSTALLIZERS

4—4' x 24' x 2'6" Deep Stainless Clad Steel, Jacketed—1800 gals.

DRYERS

1—4 ft. Dia. x 6 ft. long Steel Dryer, inside lined with Sprayed Stainless Steel, Foote Bros. Reducer Drive.
3—Barlett & Snow Vertical Steel, Jacketed, 10' dia. x 4' high. Agitators, Reducers, 2 H.P. Motors.

EXTRACTORS

1—Burkhardt 40" dia. with Rubber Covered Baskets.
1—King & Gerber, 38" dia. with Bronze Basket.

FRACTIONATING COLUMNS

1—18' dia. — Cast Iron — with Dephlegmator — 15 sections, each 6" high — 2 top & bottom sections each 18½" high.

KETTLES

1—4' dia. x 7' deep, open top, jacketed steel kettle, bottom outlet, no agitator or drive. 700 gals. capacity.
1—6'-9" dia. x 9'-0' deep, "Lehigh" Cast Iron Kettle with 2 Heating Coils, Agitator & Drive, 2500 gals. capacity.
1—6' dia. x 8' deep Steel Kettle with removable Head, 1600 gals. capacity.

MILLS

1—16" Style D Schutz O'Neill Pulverizing Mill.
1—20" Style D Schutz O'Neill Pulverizing Mill.
1—Raymond Impact Mill, Direct Drive. Size 4-0.
1—No. 21 Quaker City Hammer Mill.
1—15" x 8" Jeffrey Rigid Hammer Mill.

PUMPS

3—Devine Rotary Valve Vacuum Pumps. Size 8" x 6¼"—52 cu. ft. Displacement.
2—Devine Rotary Valve Vacuum Pumps. Size 10" x 10"—113 cu. ft. Displacement.
1—Beach Russ High Vacuum Pump—Series 100, Type R ;"—capacity 100 cu. ft. Min., complete with 5 H.P. Motor.
1—No. 5 Beach Russ Vacuum Pump complete with 5 H.P. Motor.
1—Size 1—D-Ma Crowell Vacuum Pump.
1—Lewis Vertical Acid Pump for concentrated Sulphuric Acid. 25 G.P.M.—52 ft. Head—with 5 H.P. Explosion Proof Motor.
1—Wilfley Model AB Centrifugal—7½ H.P. motor—2" Inlet, 1½" discharge.
1—Shriver Diaphragm 3A—Rubber lined, 90 gals., motor chain drive.
4—Vacuum single phase stokes—size 8" x 6", pulley drive.
1—American Well 2 Stage Centrifugal, 350 gal. 30 H.P. G.E. motor, Magnetic Starter.
1—Gould Triplex Plunger—size 3" x 4"—25 gals.
2—Gould Triplex Plunger — size 8" x 10" — 400 V Belt Drive.
1—Quimby Screw Type—size 2"—5 G.P.M.—55' head—motor drive.

ROTARY DRYER OR KILN

1—5' dia. x 40' long Horizontal Rotary Dryer, ½" shell, complete with tires, ring gear, rollers gearing, base plates.

CENTRIFUGAL

1—DeLaval Industrial Centrifugal — Model A-00 with 10 H.P. Explosion Proof Motor — 220 Volts — 3 PH — 60 Cycles and Controls.

STILLS

1—No. 2 Stokes Automatic Water Still. Cap. 10 Gals. Per Hour. Steam Heated.

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MODERN POWER PLANT including: 2—500 H.P. B & W Stirling Boiler, 250 lb. Pressure, installed new 1942. 1—680 K.W. Nordberg Full Poppet Valve Engine Generator Set, 3/60/480 Volt, non-condensing.
WATER SUPPLY: 2, 1200 g.p.m. Layne Motor Driven DEEP WELL PUMPS.
175 Acres of land. Each Building Serviced by Railroad Sidings. 100 Ton Track Scale. Ample Fire Protection. Excellent labor and housing conditions.

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4—Davenport #3A Grain Presses
1—Industrial All Steel Continuous Filter 6" x 3'0"
5—100 Gal. Each. Steel Jacketed & Agitated Tanks
1—1000 Gal. Glass Lined, Jacketed & Agitated Tank
1—Horizontal 2000# Powder Mixer with 7½ HP motor
1—J. H. Day 5 Bbl. Heavy Duty Mixer with 30 HP motor
1—Louisville Screw Type Extraction Press
1—Oliver 3x2 Rotary Filter
2—Williams Hammer Mills
30—Monel Metal Water Jacketed Tanks, 30 Gal. Cap.
1—Stainless Steel Horizontal Powder Mixer
1—18" x 24" Ball Mill
1—U. S. Colloid Mill, Stainless Steel 60 GPH
2—Schutz O'Neill 3 Pan High Roller Mills
1—Sperry 18" x 18" Plate & Frame Filter

Write for Latest Stock List

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EQUIPMENT & SUPPLY CO.,
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AVAILABLE

1—Raymond 5-roll high side Pulverizer.
2—(New) 24 x 48" Vibrating Screens.
3—26, 28, 40" copper basket Centrifugals.
1—24" Mikro Pulverizer—belt drive.
2—#600 De Laval Clarifiers.
1—Proctor & Schwartz Apron Dryer.
1—Packomatic 4-spout Net Weigher & Filler.
1—4 x 6' Atmospheric Drum Dryer.
4—Lead-lined Tanks, 400 and 1000-gal.
1—#5 Sweetland Filter.
1—Oliver Filter: 5 x 4' open wood drum.
1—Union 10x20x12" Dry Vacuum Pump.
1—3x15' direct heat Rotary Dryer.
4—Water Stills: 10 and 25 GPH.
1—40" Tolhurst self-centering Centrifugal.
1—10 gal. Buflovak jac. Autoclave.
What equipment have you for sale?

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HELP WANTED

CHEMICAL SALESMEN: Middle west chemical manufacturer desires services of several men with experience in selling industrial nitrogen products and industrial alcohols. Give full details concerning education, experience, age, salary, and recent photograph. Box 2099, Chemical Industries, 522 Fifth Ave., New York 18, N. Y.

SITUATIONS WANTED

CHEMIST—METALLURGIST—A.B. Chemistry, age 26, married. Two years as metallurgist of small steel foundry. Complete charge of heat treatment, sand control, and X-ray. Two years with prominent research institute. Tank fabrication, catalytic studies, data correlation, and extensive report writing. Excellent references. Aggressive personality combined with good appearance and proper poise. Interested in position involving administrative ability and technical background or technical sales. Location immaterial. Box 3002, Chemical Industries, 522 Fifth Ave., New York 18, N. Y.

EXECUTIVE CHEMIST with over twenty-five years very broad experience in chemical research, pilot plant construction, production, development and standardization of methods of analysis, instrumentation, advertising and technical sales, patents, publications, technical society and association activity, available immediately, preferably as leader of product or technical sales division. Box 3003, Chemical Industries, 522 Fifth Ave., New York 18, N. Y.

Sales representative with good contacts in the Leather and Paper Industries, desires products used by these industries located in the middle west. Box 3000, Chemical Industries, 522 Fifth Ave., New York 18, N. Y.

CHEMICAL ENGINEER wants position in development or general management. Chemical Engineering degree in 1933. Nine years experience in sales. Sales executive for five years. Mid-west or West Coast location preferred. Age 36. Available for personal interview upon release from Naval Reserve in May or June. Box 3001, Chemical Industries, 522 Fifth Ave., New York 18, N. Y.

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U. S. Rubber Sales At New High

Consolidated net sales of United States Rubber Company for the year 1945 reached a new high of $471,506,473, according to the fifty-fourth annual report to stockholders. This represents an increase of 6.4 per cent over sales of $443,077,453 reported for 1944.

As in previous years, 1945 sales do not include a substantial volume of production in munitions and synthetic rubber plants owned by the government and operated by the company on a cost-plus-fixed-fee basis. This production amounted to more than $310,000,000, for which a fee of $4,940,958 was received.

Net income totaled $13,024,778 after deducting all charges, including provisions for Federal and foreign income taxes and all known expenses relating to the war. After allowing for $8 a share on the preferred stock, this was equal to $4.44 a share on the common stock. Net income for 1944 was $15,832,613, or $6.04 a common share.

Koppers Acquires Another Subsidiary

Acquisition of the entire common stock of Wailes Dove-Hermiston Corporation, of Westfield, N. J., by Koppers Company, Inc., of Pittsburgh, has been announced in a joint statement issued by J. N. Forker, Koppers vice-president, and Linden Stuart, president of the New Jersey company.

Wailes Dove-Hermiston Corporation, as a manufacturer and contractor of bituminous coatings for the protection of iron and steel against corrosion, will continue to operate as a separate organization with the same management.

Hungerford Plastics Corporation Organized

Formation of Hungerford Plastics Corporation, with a plant in Murray Hill, N. J., has been announced by Dan C. Hungerford, president.

The organization will provide a complete thermo-plastic service, including product and mold design, mold manufacture, material compounding, and facilities for injection and extrusion molding.

Penicillin Plant Offered by WAC

A chemical plant utilized for the production of penicillin during the war is offered for sale or lease by the War Assets Corporation.

Operated by the Heyden Chemical Corporation, the plant occupies forty acres in Penns Neck, Princeton, N. J., with thirty acres available for outside storage or further expansion.

National Starch Opens Southern Office

National Starch Products, Inc., has announced the opening of a new southern division with headquarters at 1200 South Front Street, New Orleans, under the managership of H. F. Stegall.

The new division, which is expected to form the nucleus of National's expanding activities in the area, will serve Louisiana, Texas, Oklahoma, Arkansas, Mississippi, and Western Tennessee.

Hanna Establishes Research Bureau

Establishment of a new department by The M. A. Hanna Company to conduct technological research in coal and other industrial lines in which the company is interested has been announced.

The new department is intended to provide research service for Hanna customers and also to supplement the work of existing coal research organizations, vice president James Prendergast said. It will be concerned not only with the technical problems of coal users but also with the development and advancement of the use of coal-derived hydrocarbons by the chemical, plastic, and other industries.

George D. Creelman, administrative assistant at the Institute of Gas Technology, Chicago, will direct the research department.

BUSY EXECUTIVES

read

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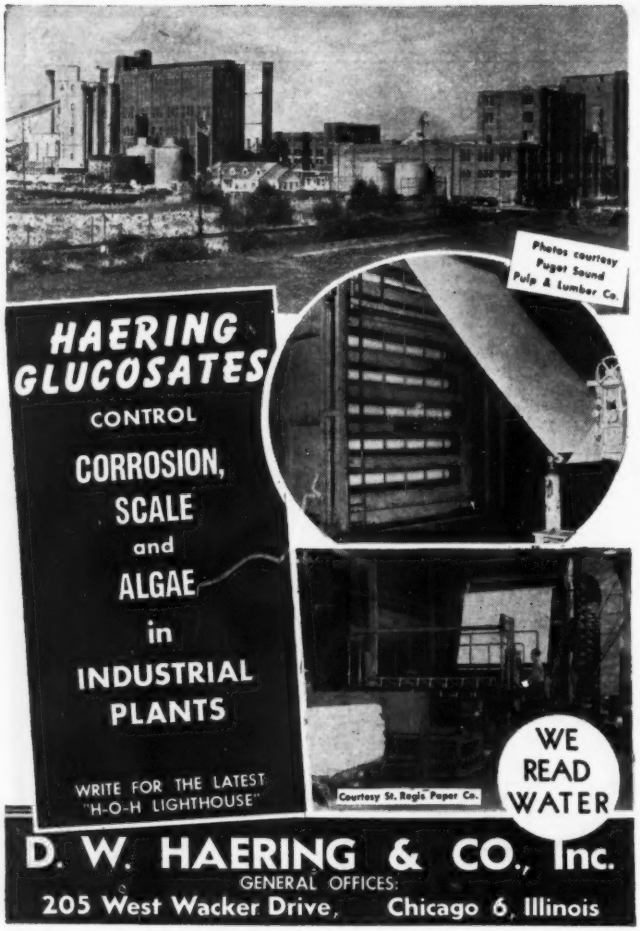
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"WE" – EDITORIALLY SPEAKING

RECEIPT OF foreign mail is one of the delights of an editor. Almost every day we see the brightly colored postage stamps of some foreign land—China, Syria, The Netherlands, Brazil, and our near, hardly foreign neighbor, Canada. Many of them we never see, of course, since they are concerned solely with subscriptions, advertisements, or the like. But all the questions—and what a variety of them!—come across our desk. A Puerto Rican, for example, who undoubtedly heard of the craze current in American dime stores before Christmas, asks for a soap bubble formula. The international trade situation is reflected in a letter from Sweden asking the name of a good English-German dictionary. Our favorite, though, is one from Italy in which all of us in the industry can take pride: ". . . . from what we noticed here, U.S.A. are heading civilization and progress in every direction."

Let's try to live up to that compliment!

WE WERE AMUSED to read in *Dorrco Doings* about the woman at the Exposition of Chemical Industries who was going from booth to booth asking questions of engineers. The nature of her queries led her victims to suspect that she was not a potential customer. They were right: It turned out that she was gathering questions to "stump the experts" on some radio quiz show.

Now why doesn't some enterprising young engineer compile a list of knotty problems, buy a mailing list of proved suckers, and sell them his questions for $5 for them to send in to the programs in hope of receiving a manifold return on their investment?

SPEAKING OF the profitable conversion of garbage into fertilizer, there's gold in them there swills!

THE ABOVE PUN is made to justify some of the remarks we are about to make concerning magazines. Being an amateur etymologist, we looked up "magazine" in our favorite dictionary and discovered that it is derived through the French and Italian from the Arabic *makhazin*, the plural of *makhzan*, storehouse, granary, cellar.

Ah, we thought, we are a veritable "storehouse of information." So far, so good. "Cellar" too we liked, when we thought of our magazine as a treasure chest at the very foundations of the chemical industry whence rare and priceless facts (of not too old a vintage) are brought to light. But "granary" made us wince—reminding us that corn was to be had on this page!

READING IN OUR February issue about the size of the writing ink industry—there's gold in them there quills! We felt that one coming on, but try as we would we couldn't stop it.

"SUCCUMB TO THE glorious magic of caustic soda. Use it soon—tonight—and see the look of love steal into your operator's eyes. Climb to the dizzy, windswept heights of happiness! Use caustic soda—tonight!"

We sat down and pounded the above out on our typewriter, thinking that perhaps the chemical advertisement copywriters might pick up a trick or two from the perfume people. On second thought, we think they had better not.

SCIENCE IS with us before we take our first breath, and now it follows us even after we draw our last. We read that physicians can now use an ultra-violet light to determine within seconds, in advance of usual signs, whether a patient is dead. Speeds the reading of the will, probably.

PEOPLE HAVE a lot of trouble with chemical names. Those not "in the know" invariably stumble over dimethylglyoxime and the like. Today we unveil, with fanfare in the background, our facetious contribution to chemical terminology: just pronounce the formulas. Formic acid, which is HCOOH, by slight rearrangement becomes "hooch." A more complicated one, like sodium oxalate, $Na_2(COO)_2$, becomes "nanacoocoo," or "coonacoona" if you prefer. Can you think of other "simplifications"?

WE WERE TALKING with an oil man at lunch the other day. His comment on butadiene, the chief constituent of synthetic rubber derived largely from petroleum gases: God never meant it to be made!

Fifteen Years Ago

From Our Files of April, 1931

Confirmation is made in Italy of the earlier report concerning joint financial interest of Montecatini and I. G. in the "Acna" enterprise, a large chemicals and dyestuffs manufacturer. Subscribing a total of 60,000,000 lire, both companies have strengthened their international position.

Columbia Chemical Co. absorbs the alkali division of Isaac Winkler & Brother Co., New York and Cincinnati.

Agreements among General Electric Co., Du Pont Co., American Cyanamid Co., and the Ellis-Foster Co. free alkyd resins from patent restrictions. These agreements allow each group to pursue commercial and technical development with the assurance of immunity against prosecution of itself or its customers under patents presently or potentially owned by the other groups.

Completion of the expansion program involving the expenditure of approximately $5,000,000 by the Solvay Process Co. in the Syracuse area is set for April 1.

Construction work on the Bound Brook plant of Bakelite Corp. is rapidly nearing completion.

Thirty Years Ago

From Our Files of April, 1916

Increased production of carbolic acid has forced the price down to around a dollar per pound.

The Rittman Process Corp. purchases the plant of the Benzol Products Co. on Neville Island in the Ohio River.

The Du Pont Co. offers to build, at its own expense, a plant for the production of nitric acid from air if the government will amend laws restricting use of water power. It is estimated that the cost would be $20,000,000.

Eimer & Amend plan 10-story addition to its present building at a cost of $300,000.

Forest Products Laboratory perfects process for alcohol from sawdust at a cost of 13 to 15 cents per gallon. Howard F. Weiss, director, declares that "the experiments have proved conclusively that grain alcohol will be the twentieth century running mate for gasoline."

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"Metso 99" (Na_3HSiO_4: $5H_2O$). Sodium sesquisilicate. U. S. Patents 1948730, 2145749. White, granular and free flowing. Packed in 400 lb. steel drums.

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PATENTS AND TRADEMARKS

Abstracts of U. S. Chemical Patents

A Complete Checklist Covering Chemical Products and Processes

Printed copies of patents are available from the Patent Office at 10 cents each. Address the Commissioner of Patents, Washington, D. C., for copies and for general information concerning patents or trade-marks.

From Official Gazette—Vol. 581, No. 4—Vol. 582, Nos. 1, 2, 3 (Dec. 25-Jan. 15)—p. 649

** *Polymers*

Stable aqueous emulsion obtained by polymerizing normally liquid water-insoluble polymerizable monomeric vinyl compound in presence of anion-active surface tension depressant to aid in obtaining stable emulsion and as emulsifying agent, two organic hydrophilic colloids. No. 2,388,600. Henry Collins to Shawinigan Chemicals Ltd.

Coarse-grained suspension of a polyvinyl ester, comprising, discrete globules of polyvinyl ester suspended in water. No. 2,388,601. Henry Collins to Shawinigan Chemicals Ltd.

Polymerization of vinyl esters in emulsion. No. 2,388,602. Mogens Kiar to Shawinigan Chemicals Ltd.

Elastomer comprising product of thermal reaction of water-insoluble ethyl cellulose, normally solid, crystalline substituted polyphenyl hydrocarbon selected from ortho nitro-diphenyl, ortho, meta and para diphenyl benzenes and mixtures; and hydrogenated higher fatty acid glyceride. No. 2,388,613. Harry Keller to Monsanto Chemical Co.

Obtaining synthetic linear polyamide which contains agent which imparts to palyamide improved durability on continued exposure to sunlight and which is not removed by washing, comprising impregnating polyamide with solution of resin-forming components comprising catechol, formaldehyde and acidic catalyst. No. 2,388,676. Donald Coffman and Halsey Stevenson to E. I. du Pont de Nemours & Co.

Solid thermoplastic polymeric product flexible at temperatures as low as —50° C. and prepared by polymerizing styrene, adding butadiene-1.3 and polymerizing. No. 2,388,685. Cyrus Guss and Roger Amidon to The Dow Chemical Co.

Polyvinyl ketal acetal resin formed by reaction of a hydrolyzed polyvinyl acetate with methyl ethyl ketone and butyraldehyde. No. 2,388,802. Joseph Ryan and Fred Shaw to Libbey-Owens-Ford Glass Co.

Water-soluble resinous material which, when water of a water-solution of which it is a part, is evaporated becomes insoluble in water, water-soluble material having resulted from deesterification of a copolymer of vinyl acetate and a mono beta-chlorallyl ester of monocarboxylic acid. No. 2,388,851. William Kenyon and William Fowler, Jr. to Eastman Kodak Co.

Bending plastic tubing which comprises filling bore of tubing with finely divided dehydrated substance of inert character, plugging ends, suspending tubing over form, introducing tubing bath of heated liquid. No. 2,389,038. Milo German.

Condensation product of aldehyde with solid substance obtained by heating primary aromatic amine with dicyandiamide. No. 2,389,150. David Jayne, Jr. and Harold Day to American Cyanamid Co.

Airplane wing having improved airfoil characteristics comprising preshaped metal body with projecting rivet heads carrying, coating of 0.25 inch in thickness comprising organic polymer of porous, spongelike structure, selected from polymers. No. 2,389,210. Earle Pitman to E. I. du Pont de Nemours & Co.

Heating polyunsaturated fatty material having unconjugated double bonds with alkaline agent. No. 2,389,260. Hans Kirschenbauer to Colgate-Palmolive-Peet Co.

Cellulose ether plasticized and stabilized by compound selected from para-tertiary butyl phenoxy ethanol, para-tertiary amyl phenoxy ethanol, and para-tertiary butyl phenoxy ethyl acetate. No. 2,389,354. Walter Gloor to Hercules Powder Co.

Plastic composition comprising ethyl cellulose and catechol, having a para-mono substituted methyl group, as a stabilizer therefor. No. 2,389,370. William Koch to Hercules Powder Co.

Insulating electrical conductors with resin derived from reacting maleic anhydride and styrene. No. 2,389,379. Leon McCulloch to Westinghouse Electric Corp.

Resinous product of reaction of (1) a polyamide selected from urea, thiourea, phenyl thiourea, malonic diamide, succinic diamide, citric triamide and phthalamide, (2) an aldehyde and (3) a salt of a crystalloidal amino carboxylic acid. No. 2,389,415. Gaetano D'Alelio to G. E. Co.

Compounds produced from salts of sulphamic acid which comprises bringing into contact (1) a polyamide selected from urea, thiourea, malonic diamide, succinic diamide, citric triamide and phthalamide, and (2) reaction product of formaldehyde and a salt of sulphamic acid. No. 2,389,416. Gaetano D'Alelio to General Electric Co.

Plastic fiber-binder composition consisting of mass of reinforcing fibers including long and harsh mineral wool fibers and polyvinyl resin binder, said composition including vaporizable solvent to form with binder a colloidal adhesive gel, said binder comprising polyvinyl resin and flameproofing plasticizer. No. 8,389,460. Harry Rinehart to Johns-Manville.

Polysiloxane resins. No. 2,389,477. James Wright and James Marsden to General Electric Co.

** *Processes and Methods*

Recovering carbon bisulphide in production of viscose products by collecting carbon bisulphide vapors given off during processing. No. 2,387,763. Enrique Luaces to Research and Development Corp.

Analysis of gas mixture containing plurality of components, with a mass spectrometer having ionization chamber and sample chamber connected thereto through inlet system. No. 2,387,786. Harold Washburn to Consolidated Engineering Corp.

Continuous separation of non-magnetic particles of different specific grav-

** *Continued from Vol 579, No. 5, Vol. 580, Nos. 1, 2, 3*
(Continued on page 707)

Patents Available for License or Sale

The Patent Office is regularly publishing a Register of Patents Available for Licensing or Sale. Patents concerning chemical products and processes appear below.

Alien Property Custodian James E. Markham has announced the availability for licensing of a group of patents relating to the production of synthetic gasoline by the Fischer-Tropsch process.

Licensing of the patents has been delayed until now, pending disposition of claims to exclusive licenses, Mr. Markham said. Licenses are available on a royalty-free, non-exclusive basis for an administrative fee of $15.00 each.

A list of the patents may be obtained from the Patent Use and Development Section, Office of Alien Property Custodian, Washington 25, D. C. Full licensing information will be sent to those requesting the list.

January 22, 1946

Pat. 2,244,681. **Charge Forming Apparatus.** Patented June 10, 1941. (Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757.) Rockable tray has a number of compartments holding powdered material. Floor of each compartment has a scoop-like depression used as a measuring chamber which fills when tray is tilted in its direction. When tilted in opposite direction finger in bottom of depression slides open and material flows through opening into container. Used for loading explosives. Inventor states rapid and accurate operation is possessed by apparatus. (Owner) Col. Edward M. Florcyk, c/o Lux, 13 Circuit Ave., Tuckahoe, N. Y. Groups 28—84; 35—59—65. Reg. No. 958.

Pat. 2,271,308. **Bottle Seal Cutting and Trimming Device.** Patented Jan. 27, 1942. Effectively removes or cuts away a seal at a plurality of desired places and thus, when the bottle is opened, provides a clear neck which will facilitate the ready pouring of the contents of the bottle uncontaminated by the metal of the seal. (Co-owner) William F. Ross, 2509 Winnemac Ave., Chicago 25, Ill. Groups 33—52; 40. Reg. No. 975.

Pat. 2,371,254. **Therapeutic Compound.** Patented Mar. 13, 1945. A compound, characterized by the substitution of unsaturated aliphatic compounds with amino-arylsulfamides on the amino-nitrogen compound, useful for therapeutic application. According to inventor product possesses increased bactericidal power and is less harmful than present similar products in combating streptococci, staphylococci, and spirillac infections. Examples given in patent. (Owner) Simon J. Nathan, 3213 Jocelyn St., N. W., Washington 15, D. C. Group 28—31—89. Reg. No. 987.

Pat. 2,323,268. **Metallurgical Mill Reagent Feeder.** Patented June 29, 1943. Utilizes principle of amount of liquid which will flow through a calibrated orifice from a constant head source for an adjustable predetermined period of time. When predetermined amount of ore is fed to mill electrically actuated means fully opens orifice of valve and at end of predetermined period fully closes valve. Valve will not become clogged; and measuring tanks or float valves are eliminated. (Owner) Fremont E. Wood, 3584 Cedar Ave., Long Beach 7, Calif. Groups 33—11; 35—65; 36—13. Reg. No. 991.

Pat. 2,077,412. **Process for the Preparation of a Molded Cellulose Foam from Viscose and Product Thereof.** Patented Apr. 20, 1937. A very light cellular structure of regenerated cellulose is produced by converting viscose into a foam and subjecting it to spontaneous coagulation. Owner claims articles outstanding as heat and sound insulators, and shock absorbers can be shaped by casting into forms, molding, cutting, boring, bending, etc. Properties can be modified by the use of fillers, plastifiers, binders, and impregnants. (Co-owner) Eugene J. Lorand, 1208 Lovering Ave., Wilmington 12, Del. Groups 28—83; 36—11; 39—81. Reg. No. 994.

Pat. 2,109,657. **Medicated Filler Sole.** Patented Mar. 1, 1938. Tapered filler of sponge rubber or the like is placed between outer and inner sole and extends from heel to shank. Plurality of longitudinal passages communicate with each other and with non-compressible chambers in which suitable medicament or deodorant is placed. In walking air is forced forwardly by diminishing size and constriction of passages as filler is compressed from back to front and air comes into contact with foot through slots at forward end of filler. Chambers may be replenished with medicament or deodorant when necessary. (Owner) Joseph A. Perault, 767 Park Place, Brooklyn 16, N. Y. Groups 30—52; 31—41. Reg. No. 995.

(Continued on following page)

(Continued from preceding page)

January 29, 1946

Pat. 2,353,132. **Dispensing Container.** Patented July 11, 1944. For heavy liquids, powdered or granular substances. Means for stirring contents with the opening and closing of valvular means that controls discharge opening. Shaft in center of closure has series of stirring arms and as shaft rotates arms plough through contents. Made of non-rusting, non-corrodible material. Louis Frank, P. O. Box 142, Fellows, Calif. Groups 32—21—29; 33—73; 39—81. Reg. No. 1,013.

Pat. 2,272,518. **Pump.** Patented Feb. 10, 1942. When power is applied to drive shaft, rotation of parallel discs mounted at 30 degree angle results in oscillating motion. Discs bear against ends of push rods extending through cylinders causing reciprocating movement of push rods. Pistons float within cylinder. Rotary oscillating motion of discs causes splash lubrication. (Co-owner) Edward Hulsmann, 421 Webster Ave., Chicago 14, Ill. Group 35—61. Reg. No. 1,025.

Pat. 2,380,436. **Level Indicator and Recorder for Molten Glass.** Patented July 31, 1945. Device is positioned upon a platform attached to side of a melting tank or vat. Hollow shaft entering tank is bent at right angles to form an arm having electrical contact point. Arm swings up and down to periodically contact molten fluid and reverse direction of motor. Other means are actuated for causing motor to revert to forward direction. Yoke and cam arrangement engage and move recording means back and forth across a vertically rotating chart graduated with successive hours so that a permanent record of variations in level of fluid is maintained over desired period of time. Should fluid rise to dangerous level device will open a switch and shut down entire plant. (Owner) Robert E. Holdman, P. O. Box 157, Times Square Station, New York 18, N. Y. Groups 33—12; 35—59; 36—13. Reg. No. 1,016.

February 5, 1946

The following patents owned by Wisconsin Alumni Research Foundation have been dedicated to the public by an instrument recorded in the United States Patent Office, January 11, 1946:

Pat. 1,871,135. **Antirachitic Product and Process.** Patented Aug. 9, 1932. Subjects cereals to action of artificially produced ultra-violet rays for a period sufficient to effect antirachitic activation but so controlled as to avoid subsequent substantial injury to such principle or deleterious effects of product. Groups 20—41—43; 28—31.

Pat. 1,871,136. **Antirachitic Product Essence and Process.** Patented Aug. 9, 1932. Process relates to producing an antirachitic substance in concentrated form from substances rich in unsaponifiable liquids. Groups 20; 28—31.

Pat. 1,704,173. **Process for Treating Foods.** Patented Mar. 5, 1929. Process for making ultra-violet rays of the sun practically available for the production of the antirachitic principle for treating foods without destroying the beneficial qualities or effects inherent in such foods. Groups 20; 28—31.

Pat. 2,057,399. **Antirachitic Product and Process.** Patented Oct. 13, 1936. Process for subjecting yeast to the action of ultra-violet rays for a sufficient period to effect substantial antirachitic activation. Product of process is also claimed. Groups 20—91; 28—31.

Pat. 1,723,603. **Process of Sterilization and Food Activation.** Patented Aug. 6, 1929. Process for producing palatable, non-deleterious activated food products. After limited amount of organic acid has been added to the pasteurized product to protect vitamin C it is placed in an air tight container and subjected to rays from which substantially all of the infra-red rays and all ultra-violet rays shorter than 2000 A. U. have been filtered. Groups 20; 28—31.

Pat. 2,175,340. **Vitamin Malted Liquors.** Patented Oct. 10, 1939. Process of incorporating oil-free vitamin D to liquors in such manner that potency of the vitamin is not impaired, nor foaming properties of the liquors destroyed. Groups 20—81—82—85; 28—31.

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Los Angeles 13, California. 530 South Hope Street.
Kansas City, Missouri. Midwest Research Institute, 4049 Pennsylvania.

February 12, 1946

Pat. 2,038,915. **Dispenser.** Patented Apr. 28, 1936. For mounting on bottles containing semi-liquids. Air pump mounted in casing has cylinder with tube extending therefrom for delivering air under pressure into bottle. Connecting rod couples pump to hand lever. By tilting bottle and actuating lever, pump forces air into bottle and contents out through tube. (Owner) Edward J. Unger, 138 College Ave., Annville, Pa. Groups 32—21; 33—73; 34—99; 40. Reg. No. 2,262.

The International Harvester Company has ready for distribution a pamphlet giving abstracts of its patents which are offered for license: the pamphlet also contains a statement with respect to its license policy. Copies of the patents have been filed with the Register of Patents, U. S. Patent Office, where they may be inspected by interested parties.

Requests for copies of the abstract pamphlet should be made direct to Patent Department, International Harvester Company, 180 North Michigan Ave., Chicago 1, Ill.

February 19, 1946

Pat. 2,304,323. **Pressure Operated Throttling Valve.** Patented Dec. 8, 1942. Pilot valve is opened when control is depressed, releasing flow of fluid from inlet chamber through narrow passage into chamber over main valve piston forcing it down thus opening valve seat and allowing fluid to flow through outlet. This throttling action causes pressure to be built up again in the inlet chamber so that action is repeated. (Owner) Irvin E. Wiegers, 3700 Colin Court, Overland 14, Mo. Group 33—61. Reg. No. 2,271.

Pat. 2,385,195. **Dispensing Attachment for Containers.** Patented Sept. 18, 1945. Attachment for threaded bottle or jar opening comprises a hollow dome-shaped cap from which a measuring tube extends obliquely downward. Lower end of tube has springed cover. By tipping container, contents flow into measuring tube for discharge into a receptacle. Tubes of different capacities may be provided. (Owner) Joseph B. Clower, Woodstock, Va. Group 33—73. Reg. No. 2,272.

Pat. 2,008,199. **Device for Measuring the Density of Smoke.** Patented July 16, 1935. Comprises a chart arrangement by which smoke or the like may be brought into direct juxta-position to a graded color band; a device which will function to focus the vision of the observer on the smoke being observed; and a device which will provide a record of the degree of density of the smoke observed. (Owner) Harvey E. Bumgardner, 2010 Roseland Ave., Royal Oak, Mich. Groups 26—27—91; 39—11. Reg. No. 2,300.

February 26, 1946

Pat. 2,272,260. **Container Closure.** Patented Feb. 10, 1942. Closure for bottles and tubes is made up of a rotatable valve with a pouring passage and an air vent, a cap having similar openings alignable with the valve openings, and a ferrule holding the assembly together. The ferrule is provided with stops to set the open and closed positions and lugs to seal the pouring and air vent passages when the closure is closed. The tube closure is similar to the bottle closure, except that the air vent is not required. Designed to be manufactured from plastics by injection molding process. (Co-owner) William I. Ballentine, 603 North Maple Drive, Beverly Hills, Calif. Groups 30—51; 39—81. Reg. No. 2,312.

Pat. 2,348,673. **Rotary Kiln for Extraction of Mercury from Its Ores.** Patented May 9, 1944. Apparatus sealed against admission of air utilizes a corrugated rotary drum made of stainless steel mounted on hollow bearings. Material is delivered to drum through one of these bearings from a hopper having an air lock, the other being an exhaust bearing. Inventor states that because of the design of the apparatus and absence of air it is possible to prevent the mercury from recombining with the sulfur and to pass the latter off into the condenser or into the atmosphere while condensing merely the mercury in extremely pure form with maximum amount of recovery from the ores. (Owner) Charles F. Degner, 1331 North Wells St., Chicago 10, Ill. Group 34—19. Reg. No. 2,318.

The following patents, owned by the United States, as represented by the Secretary of the Interior, are available for licensing, upon a non-exclusive, royalty-free basis:

Pat. 2,118,829. **Preparation of Cobalt-Copper Catalyst.** Patented May 31, 1938. Relates to the oxidation of carbon monoxide in water gas to carbon dioxide by steam; and has for its object the preparation of a cobalt-copper catalyst for this and similar reactions which will give high activity for extended periods, and which is in the mechanically desirable form of hard, porous granules. Group 28—88. Reg. No. 2,329.

Pat. 2,119,560. **Electrolytic Process for the Extraction of Metallic Manganese.** Patented June 7, 1938. Process utilizing a high degree of current deficiency produces substantially pure manganese deposits without seriously affecting the usefulness of the electrolyte during long periods of operation. Deposit is maintained at a high level to control formation of nodular deposits or "trees" on the cathode. Partially spent electrolyte passes into chambers where it is treated with a metallic salt and restored to its initial strength, purified, and, with the addition of sulphite ions for prolonging life, reintroduced. Groups 28—88; 32—95. Reg. No. 2,330.

Pat. 2,185,224. **Purification of Rock Minerals.** Patented Jan. 2, 1940. Process for concentrating phosphate bearing minerals makes use of "cationic agents." One aspect is partial or complete removal of clay without removing finely divided phosphates. Process concentrates the gangue away from the ore instead of concentrating the valuable mineral. Group 28—89. Reg. No. 2,332.

Pat. 2,215,484. **Sonic Flocculator and Method of Flocculating Smoke or the Like.** Patented Sept. 24, 1940. Provides a method and means for passing an aerosol through the flocculating chamber of a sonic flocculator in a continuous stream without at the same time allowing an appreciable loss either in efficiency of the sound generating apparatus, or in sound energy through the inlet and outlet ports of the flocculating chamber. Group 35—69. Reg. No. 2,333.

Pat. 2,255,069. **Method and Apparatus for Separating and Concentrating Gases.** Patented Sept. 9, 1941. Provides a method and apparatus for effective and economical separation by the purely mechanical or physical means as distinguished from chemical methods. A continuous flow of vapor at one surface of the diffusion boundary not only sweeps away diffused gases and maintains maximum concentration gradient in the diffusion boundary, but also furnishes gaseous vapor molecules which take the place of diffusing molecules, thus enabling static pressure balance

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on opposite sides of boundary to be maintained. Separation is obtained under conditions closely approaching maximum permitted by kinetic gas theory. Group 28—86. Reg. No. 2,334.

Pat. 2,283,954. **Apparatus for Testing the Embrittlement Cracking Characteristics of Solutions.** Patented May 26, 1942. Group 35—69. Reg. No. 2,335.

Pat. 2,283,955. **Means for and Method of Testing Embrittlement Cracking Characteristics of Solutions.** Patented May 26, 1942. Group 35—69. Reg. No. 2,336.

These two patents provide an apparatus for receiving a direct and continuous flow of solution from a boiler wherein test is conducted under conditions normally occurring within boiler. Solution flows past specimen at a slower rate than evaporation so that concentration takes place in contact with specimen. Patent #2,283,-955 provides for testing large specimens by assembling plates to form a boiler seam provided with a leakage opening, several modified forms being shown. In one form seam bolted together may be part of a test drum or disposed therein. In another form a valve controls admission of solution to joint.

Pat. 2,288,610. **Treatment of Ores.** Patented July 7, 1942. Process for treating acid-soluble mixed alkaline earth metal ores with mineral acids or acid solutions applicable to dolomite, calcareous magnesite, calcareous brucite, ankerite or aggregates containing acid-soluble magnesium and other alkaline earth metals. Specific application of the process is set forth in connection with the treatment of dolomite whereby a relatively highly pure magnesium oxide and pure grade calcium carbonate as a by product are obtained. Groups 28—88; 34—15. Reg. No. 2,337.

Pat. 2,297,538. **Liquid Oxygen Explosive.** Patented Sept. 29, 1942. Relates to liquid oxygen explosives and to rendering fire resistant such explosives as well as the containers or wrappers therefor. Inventor states that he makes available fire-retardant treatments that have proved capable of rendering the explosive practically non-inflammable without materially decreasing the propulsive strength or rate of detonation or impairing other useful properties of the explosive. Examples set forth in patent. Groups 28—84; 33X. Reg. No. 2,338.

Pat. 2,297,670. **Method of Protecting Boilers and the Like Against Embittlement.** Patented Sept. 29, 1942. Process for adding treating agents to boiler water or other solution to prevent or reduce embrittlement of boilers. Such agents may be crude or purified lignin or its derivatives, zinc or certain soluble nitrates in specified minimum ratios to the soda present in solution to be treated and the temperature at which water is maintained in boiler. Ratios and condition of such material are set forth in patent. Groups 28—34; 35—69. Reg. No. 2,339.

Pat. 2,297,689. **Separation of Feldspar from Quartz.** Patented Oct. 6, 1942. Relates to the preparation of ores for separation by froth flotation and/or agglomerate table concentration or similar methods. Is especially applicable to concentration of feldspar from quartz and the separation of feldspar from other associated minerals. Group 35—33. Reg. No. 2,340.

Pat. 2,317,413. **Process for the Concentration of Boron Chemically Combined from its Ores by Auto-flotation.** Patented Apr. 27, 1943. Auto-flotation process comprises floating boric acid in the presence of protective colloid depressing agents, such as starch, corn dextrine, quebracho; gum arabic and glue or their equivalents with metallic salts whose cations form insoluble borates, such salts being selected from the group consisting of aluminum and copper salts. Examples and tables set forth in patent. Group 28—89. Reg. No. 2,341.

Pat. 2,353,193. **Recovery of Metallic Magnesium.** Patented July 11, 1944. Process of condensing magnesium metal from a mixture of magnesium vapor and oxides produced at high temperatures in which helium is introduced to condense the magnesium, such mixture including the helium being subjected to a supersonic wave. Pure magnesium in a coherent state is obtained. Groups 34—19; 28—88. Reg. No. 2,342.

Pat. 2,366,184. **Production of Potable Water from Saline Solutions.** Patented Jan. 2, 1945. Device particularly useful to shipwrecked mariners or aviators whereby sea-water or other aqueous saline solutions are sufficiently desalted for potability by a purely physical process employing only solar radiation and cooling effect of the sea. Rubberized housing separated into two chambers by a permeable diaphragm is inflated, placed in sea and salt water circulated therethrough. Modification shows a more elaborate device. Groups 28—34; 37—22. Reg. No. 2,345.

Pat. 2,374,674. **Method for Thermal Decomposition of Metallic Nitrates.** Patented May 1, 1945. Process for thermal decomposition of metallic nitrates and recovery of liberated gases during such decomposition. A portion of liberated gases collected during previous decomposition are heated or superheated and brought into contact with a shallow pool of molten metallic nitrate. Dilution of the evolved gases or formation of scaly deposits and excessive foam is avoided. Group 28—83. Reg. No. 2,347.

Pat. 2,380,406. **Production of Low Sulphur Sponge Iron.** Patented July 31, 1945. Process relates to the production of easily reducible metals from their ores, and more particularly to production of such metals of a low sulphur content. Simultaneous desulphurization and reduction is carried out in an efficient manner with a composition prepared by pre-calcining a carbonaceous reducing agent with certain alkaline earth compounds. Example and table set forth in patent. Group 34—1. Reg. No. 2348.

Pat. 2,383,467. **Flotation of Iron Ores.** Patented Aug. 28, 1945. Process for preparation and concentration of iron ores whereby froth flotation of the siliceous gangue constituents yields an iron enriched product; more particularly to a froth flotation process for siliceous gangue constituents in iron ores, employing anionic reagents. Examples and tables are set forth in patent. Group 35—33. Reg. No. 2,349.

Pat. 2,385,819. **Benefication of Beryllium Ores.** Patented Oct. 2, 1945. Process comprises blunging finely-ground, de-slimed beryl ore in admixture with aqueous alkali, thereafter adjusting the pH of the mixture to the approximately neutral range, then agitating and aerating the mixture in the presence of a frothing agent and collector comprising a fatty acid containing from 8 to 18 carbon atoms, and separating a froth containing the beryl concentrate. Yields beryl concentrates of a marketable grade from low grade deposits. Group 34—19. Reg. No. 2,350.

March 5, 1946

Pat. 1,984,170. **Container.** Patented Dec. 11, 1934. Container for paint, varnish, etc., is provided with a straight edge wiping bar for removing excess paint from brush. Crown of can, bar and groove for receiving lid are integrally formed and stamped from a single piece of metal. Bar also serves as resting place for brush and does not interfere with placing of lid on can. (Co-owner) Arthur A. Archbold, Jr., 2125 West Pico St., Los Angeles 6, Calif. Group 33—31. Reg. No. 2,352.

Pat. 2,304,096. **Fluid System Pressure Booster.** Patented Dec. 8, 1942. (Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757.) Groups 35—12—19; 37—22; 38—31. Reg. No. 2,375.

Pat. 2,347,196. **Vacuum System Booster.** Patented Apr. 25, 1944. (Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757.) Groups 35—12—19; 37—22; 38—31. Reg. No. 2,376.

Pat. 2,363,528. **Fluid System Pressure Booster.** Patented Nov. 28, 1944. (Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757.) Groups 35—12—19; 37—22; 38—31. Reg. No. 2,377.

The three patents listed above relate to a booster which may be easily applied to any conventional circulating fluid system to raise the pressure on low pressure side. Has no moving parts; requires no additional power to operate; and replaces a section of the pipe of the circulating system. Patent #2,304,096 shows a section of pipe replaced by a venturi. The other patents show the booster in the form of a venturi, by-pass, and relief valve. The patents show the booster applied to a cooling system, a fuel system, and a vacuum operated gyroscope camera or similar instrument or an aircraft. (Co-owner) Julius Hulman, 265 Victor Ave., Dayton, Ohio.

March 12, 1946

Pat. 2,336,286. **Dilation or Expansion Testing Furnace and Measuring Means.** Patented Dec. 7, 1943. Measures expansion and tensile strength of various materials such as foundry sands, clays, and ceramics. Stationary furnace has a vertical heating chamber, open at one end. A refractory tube, having heating elements mounted thereon, is fixed within and extends below the heating chamber. A secondary refractory tube (with materials to be tested mounted between two refractory plates) is movable vertically within the fixed tube. Gauge attached to plate indicates expansion of the material. (Owner) William H. Owen, 2212 Oliver Bldg., Pittsburgh, Pa. Groups 35—69; 36—19. Reg. No. 2,401.

Pat. 2,386,128. **Multiple Dispenser.** Patented Oct. 2, 1945. For dispensing measured quantities of material. Comprises plurality of actuating handles and compartments. By pushing any handle, valves close, causing engagement of pins on rods, opening valve secured to rod and discharging contents of chamber. Contents of one or more chambers may be emptied at one time. (Owner) Carl L. Ludwig, 6314 South Overhill Drive, Los Angeles 43, Calif. Groups 32—29; 34—41; 35—51. Reg. No. 2,409.

ities from mixtures, at least one of constituents being present in full size range. No. 2,387,866. Godfrey Walker to American Cyanamid Co.

Means for filling liquid gas bottles. No. 2,387,894. Raymond Fannin.

Regenerating spent particle-form adsorbent carrying carbonaceous impurities by burning. No. 2,387,936. Edward Nicholls, Henry Noll and John Payne to Socony-Vacuum Oil Co. Inc.

Sealing storage battery having electrolyte containing chamber and interfitting parts located above chamber, which comprises coating surfaces of grooves with solution of sealing material in volatile solvent. No. 2,388,-042. Robert Daily to General Motors Corp.

Treating impure acidic solutions containing organic material which precipitates upon change in pH of solution. No. 2,388,223. Abraham Behrman to Infilco Inc.

Dehumidifying fluids, which comprises contacting fluid containing moisture with acid activated bentonite. No. 2,388,616. William La Lande, Jr. to Attapulgus Clay Co.

Drying pelleted catalyst, which comprises passing stream of hot gases over moist pellets, and removing moist gases from pellets. No. 2,388,735. Wright Gary and Robert Secor to Filtrol Corp.

Fractionating multi-component fluid material. No. 2,388,931. Edwin Nelson to Universal Oil Products Co.

Regeneration of a "spent" lump hydrogenation catalyst comprising material selected from nickel-aluminum and nickel-silicon alloys which comprises heating catalyst with rosin, removing rosin, and blowing superheated steam through catalyst. No. 2,388,959. John Drew to Hercules Powder Co.

Means for colloidal dispersion of materials comprising heat exchanger, high speed pump receiving liquid from exchanger and delivering liquid to homogenising valve consisting of taper plug having spiral thread, etc. No. 2,389,012. Arthur Ronald Trist.

Stable aqueous emulsion obtained by polymerizing normally liquid water-insoluble polymerizable monomeric vinyl compound in presence of anion-active surface tension depressant to aid in obtaining stable emulsion and

Determining oxygen content of gas used in reactivation of a catalyst. No. 2,389,046. Donald Hare to The Texas Co.

Flotation process which comprises treating pulp or ore containing sodium chloride with water-soluble compound containing cumate radical as flotation agent. No. 2,389,080. Philip Ray to Hercules Powder Co.

Catalytic conversion system of fluid type wherein catalyst is suspended in vapor and gaseous streams in conversion and regeneration zones respectively. No. 2,389,236. Donald Payne to Standard Oil Co.

System for controlling filling of oxidizable liquid into container under non-oxidizing conditions comprising electrically opened valve for liquid and electrically opened valve for inert gas, etc. No. 2,389,268. Ronald McKinnis.

** *Rubber*

Porous hardened filtering medium for separating liquid from gum constituents of latex, comprising calcined gypsum and Portland cement and

** *Continued from Vol. 579, No. 5, Vol. 580, Nos. 1, 2, 3*

talcum powder. No. 2,387,726. Jose Garriga to Corporacion Peruana del Amazonas.

Vulcanizing rubber in presence of sulfur and condensation product obtained by fusing a mercaptoarylthiazole, cyanamide and a formaldehyde polymer. No. 2,387,834. Arnold Davis to American Cyanamid Co.

Rubber integrated fabric comprising interwoven warps and wefts, formed of two different component kinds of fibres, including jute as reclaimed from rope, burlap and fibre having cohesive affinity for rubber as second. No. 2,388,140. William Hall, Jr. to Thermoid Co.

Rubber compositions containing hydrocarbon resins. No. 2,388,346. Frank Soday to The United Gas Improvement Co.

Inhibiting deterioration of rubber. No. 2,388,562. Arthur Neal and John Vincent to E. I. du Pont de Nemours & Co.

Rubber composition comprising rubber and plásticizing proportion of neutralized phosphated castor oil. No. 2,388,618. Morris Omansky to Victor Chemical Works.

Hydrochlorinating rubber in solution in aromatic hydrocarbon to chlorine content of 30 per cent and catalyzing system, thereby hastening hydrochlorination and reducing ripening period, which comprises passing hydrogen chloride gas into rubber in solution which contains Naftolen, etc. No. 2,388,651. La Verne Cheyney to Wingfoot Corp.

Limiting swelling and reducing solubility of rubber in benzene and like solvents which comprises masticating rubber, adding maleic anhydride and masticating in cold. No. 2,388,905. Patrice Compagnon and Jean Le Bras.

In vulcanizing press, a block having core portion and annular portion positioned in concentric relationship, etc. No. 2,389,178. Harry Blount and Ferdinand Coldehoff to Western Electric Co., Inc.

Plasticizing and softening sulfur-vulcanizable, rubber-like copolymer of conjugated diolefin and compound copolymerizable therewith having single olefinic linkage which comprises admixing alkylthiosuccinate having structural formula described in patent. No. 2,389,489. Russell Dean and Edwin Hook to American Cyanamid Co.

** *Specialties*

Obtaining cork-like products from polymers of ethylene. No. 2,387,730. Witty Alderson, Jr. to E. I. du Pont de Nemours & Co.

Core oil comprising polymerized rosin and drying oil. No. 2,387,827. Joseph Borglin to Hercules Powder Co.

Fire-retarding composition comprising aqueous solution of alkali alginate having finely divided borax and boric acid incorporated therein. No. 2,387,865. Arthur Van Kleeck.

Discharging fire extinguishing medium, comprising effecting sudden release of liquid carbon dioxide to lower its pressure to form snow and vapor. No. 2,387,935. Leonard Myers to Reconstruction Finance Corp.

Inhibiting emission of odor by organic offal, which comprises providing fluid body comprising aqueous solution of glycerine and sodium chloride in which to immerse offal. No. 2,387,957. Daniel Topjian.

Tabbing cement having as base a water emulsion of polyvinyl acetate and plasticizer to which is added agent which increases tenacity of film formed from the cement comprising a polyhydroxy alcohol selected from glycol and glycerol. No. 2,387,967. Henry Zimmerman.

Liquid extreme pressure lubricant for crankcase of internal combustion engines comprising mineral lubricating oil and addition agent comprising sulphur-free organic derivative of carbonic acid to increase load carrying capacity of mineral lubricating oil to prevent seizure and scoring of bearings. No. 2,387,999. Amos Knutson and Eldon Graves to The Lubri-Zol Corp.

Mixture for extinguishing stubborn fires composed of sodium chloride, pitch and graphite. No. 2,388,014. Robert Sargent and Matthew Devitt.

Making rubber cement including mixture of rubber and cyclized rubber in equal proportions and channel carbon black. No. 2,388,037. Stewart Brams to General Motors Corp.

Extreme-pressure lubricating composition comprising lubricating oil base having dispersed therein reaction product of sulphur monochloride and sulphur with aromatic hydroxy-substituted ester. No. 2,388,047. Elliott Evans and John Elliott to C. C. Wakefield & Co. Ltd.

Turbine oil which comprises petroleum lubricating oil containing (di-ethanolaminomethyl)-di-tert.-amyl-phenol effective to retard rusting. No. 2,388,057. Robert Herlocker and Milton Kleinholz and Franklin Watkins to Sinclair Refining Co.

Turbine oil which comprises petroleum lubricating oil containing, to retard rusting, a diaminomethane derivative of class represented by structural formula described in patent. No. 2,388,058. Robert Herlocker and Milton Kleinholz and Franklin Watkins to Sinclair Refining Co.

Turbine oil which comprises petroleum lubricating oil containnig, to retard rusting, diaminomethane derivative of class represented by structural formula described in patent. No. 2,388,059. Robert Herlocker and Milton Kleinholz and Franklin Watkins to Sinclair Refining Co.

Lubricant comprising hydrocarbon oil and to impart oxidation-resistant properties, an oil-miscible metal derivative of oil-soluble phenolic compositions derived from oil extracted from member of Anacardium genus of Anacardiaceae family. No. 2,388,074. John Patterson and Rush McCleary to The Texas Co.

Lubricant comprising mineral lubricating oil, lead soap of naphthenic acids containing cyclic nucleus, and hydroxy aromatic hydrocarbon. No. 2,388,083. Maurice Reswick to Standard Oil Development Co.

Anti-corrosion composition comprising mineral oil fraction of lubricating viscosity containing oil-soluble imidoesters free from amides and other oil-soluble ammonia derivatives. No. 2,388,132. Paul Fischer and Vance Jenkins to Union Oil Co. of California.

Lubricant mixture for molds used in molding rubber comprising trisodium phosphate, Turkey red oil, mixture of pine oil and alkali metal water soluble soap, gum arabic mucilage, and water. No. 2,388,153. Hugh Jones to Hugh Jones Products Co.

Antifreeze composition consisting of ethylene glycol, ethanol, borax and water. No. 2,388,155. Edwin Keller to E. I. du Pont de Nemours & Co.

Manufacturing friction facing materials compounded of fibres, solid particles of a frictioning or other agent and a normally non-cementitious heat-reactive binding substance. No. 2,388,187. Maurice Salle to Thermoid Co.

Mineral oil composition comprising viscous mineral oil fraction having in admixture to depress pour point, a metal salt of an acidic, phosphorus- and sulfur-containing reaction product. No. 2,388,199. Robert Williams and Everett Fuller to Socony-Vacuum Oil Co. Inc.

Dessicant comprising anhydrous calcium sulphate and coating therefor comprising cellulose acetate to prevent dusting. No. 2,388,390. Stanley Cook and Charles Waring to General Motors Corp.

Liquid insecticide extractive comprising mixture of Pycnothymus rigidus and organic solvent. No. 2,388,393. Hans Diem.

Mineral oil composition comprising viscous mineral oil fraction and in admixture to inhibit oxidation, vanadyl oleyl phthalate, inhibiting ring-sticking of pistons. No. 2,388,400. Frederick Frank and Darwin Badertscher and Henry Berger to Socony-Vacuum Oil Co. Inc.

Cutting oil consisting of mineral lubricating oil and naphthenic acid and also metallic naphthenate. No. 2,388,439. Leslie Raymond to A. S. Cowie & Co.

Bottle-sealing composition consisting of pale crepe rubber, and rock maple wood flour. No. 2,388,568. Nicholas Penning.

Granular soap product comprising uniform mechanical mixture of granular soap which balls when added to warm water and granular, non-balling soap product whose fat formula contains coconut oil. No. 2,388,632. David Byerly to The Procter & Gamble Co.

Magnetic core material having constant permeability comprising alloy containing nickel and iron, coated with insulating material containing talc and sodium silicate compressed into core, and permeability stabilizing filler in core selected from powdered "pyrex" glass, quartz and silicon dioxide. No. 2,388,664. Adolph Bandur, Joy Dillinger, and Arthur Ogden to Western Electric Co. Inc.

Producing soluble oil which comprises contacting sulfuric acid-treated oil with finely divided substance selected from diatomaceous filter aids, tripoli and activated carbon to form finely divided substance-pepper sludge complex. No. 2,388,677. Charles Cohen to Standard Oil Development Co.

Insecticidal composition comprising benzophenone semicarbazone and carrier. No. 2,388,684. Samuel Gertler and Herbert Haller to the United States of America as represented by the Secretary of Agriculture.

Sanitizing apparatus comprising tank adapted to receive article to be sanitized and water solution of ozone. No. 2,388,753. Walter Mallman and Clifford Kain and Richard Schaefer to Sanozone Corp.

Soap composition comprising alkali metal soap of tallow soap stock and hydrogenated rosin and purified, salt-free alkali sulfonate of a mixture of hydrocarbons. No. 2,388,767. Leopold Safrin to Wilson & Co. Inc.

Adhesive for adhering opposed bituminous surfaces consisting of coumarone-indene resin and nitroparaffin solvent. No. 2,388,846. Myer Hecht to The Atlas Mineral Products Co. of Pennsylvania.

Treating brush bristles which consists in applying viscous tacky substance which wets such bristles, combined with solvent therefor. No. 2,388,867. Ruben Peterson to The Osborn Manufacturing Co.

Gel of liquid aliphatic hydrocarbon of gasoline range and a gelling agent of formula described in patent. No. 2,388,887. Arnold Weissberger and Joseph Leiserson to Eastman Kodak Co.

Adhesive composed of sterilized, agglutinized yeast characterized in undiluted state as thick homogeneous liquid mass like thick glue. No. 2,388,910. Eric Eweson.

Dry cleaning composition for cleaning of textile and fibrous materials, comprising volatile organic liquid of dry cleaning type and as assistant an oil-soluble salt of alkyl aromatic sulfonate. No. 2,388,962. Lawrence Flett to Allied Chemical & Dye Corp.

Compositions for producing self-sustaining films which are non-tacky at ordinary temperatures, but are capable of heat-sealing at elevated temperatures consisting of polyisobutylene, cyclicized rubber, and a wax. No. 2,388,984. Gerry Mack to Advance Solvents & Chemical Corp.

Preparing stable water in oil emulsion which comprises colloidally milling petroleum solution of a linseed oil highly polymerized by heavy boiling to raise its acid content with solution of water soluble salt of metal selected from aluminum, calcium, magnesium, and zinc. No. 2,389,011. Arthur Ronald Trist.

Friction element which comprises friction facing including compacted homogeneous mixtures of powdered metal, and ceramic binder. No. 2,389,061. Jerome Kuzmick to Raybestos-Manhattan, Inc.

Linoleum composition which includes linoleum cement containing oxidized siccative oil and resin and maturing accelerator for cement, said accelerator comprising reactive condensation product of aldehyde and compound selected from dihydroxy benzophenone and di (hydroxyaryl) methane. No. 2,389,078. Paul Powers to Armstrong Cork Co.

Linoleum composition which includes linoleum cement containing siccative oil gel and maturing accelerator for cement, said accelerator comprising reactive condensation product of aldehyde and aminotriazine containing primary amino group. No. 2,389,079. Paul Powers to Armstrong Cork Co.

Preservative lubricant composition consisting of highly refined hydrocarbon oil derived from Venezuelan or Pennsylvanian crude oil containing dissolved calcium soaps of acids derived from oxidation of petroleum lubricating oil, and lower alkyl esters of said acids, resulting solution also containing oxidation-depressing thio-ether of an alcohol. No. 2,389,090. James Shields and Ulric Bray to Alox Corp.

Lubricating oil composition for steam turbines comprising hydrocarbon lubricating oil and water-insoluble mixture of primary alkyl amine and oil-soluble alkyl phenol. No. 2,389,110. Elmer Cook and William Thomas, Jr. to American Cyanamid Co.

Making plywood comprising assembling wood veneers with layer of adhesive material comprising admixture of a proteinous glue and aqueous solution of thermosetting phenol-formaldehyde resinous glue. No. 2,389,183. Charles Cone to M & M Wood Working Co.

Improved wax modifier comprising Friedel-Crafts condensation product of halogenated "tall oil" and aromatic organic compound. No. 2,389,203. Eugene Lieber to Standard Oil Development Co.

Lubricant for compressed air and steam motivated machines having high speed reciprocating pistons, which comprises hydrocarbon lubricating oil and non-drying thickened fatty oil and linear oxygen-containing polymer. No. 2.389,227. Donald Wright to Standard Oil Development Co.

Antifouling composition for application to surfaces subjected to immersion in sea water and to prevent attachment of fouling marine organisms, comprising as film-forming agent a water-insoluble, solvent-dispersed, film-forming organic vehicle, and toxic component which is condensation product of mercuric salt and aromatic compound selected from benzene and lower alkyl aryl, and alicyclic-substituted benzene hydrocarbons. No. 2,389,229. George Young to Stoner-Mudge, Inc.

Plywood body, joined together by adhesive comprising resinous reaction product of alkaline-catalyzed liquid phenol-aldehyde condensation product and a derivative of a polycarboxylic acid. No. 2,389,418. Gaetano D'Alelio to General Electric Co.

Insect-repellent composition comprising liquid compound of formula described in patent. No. 2,389,427. Samuel Gertler to the United States of America, as represented by the Secretary of Agriculture.

Filter material for separating solid particles from gas. No. 2,389,435. Robert Karlstrom to Electrolux Corp.

Making bonded abrasive articles which comprises wetting abrasive grains with liquid heat-hardenable phenolic resin, mixing wetted grains with

** *Continued from Vol. 579, No. 5, Vol. 580, Nos. 1, 2, 3*

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powdered zein, molding article. No. 2,389,462. Robert Smith to The Carborundum Co.

Making adhesive tape, which comprises making stiff and viscous solution of pressure-sensitive adhesive mixture comprising rubber, a resin, and zinc oxide in non-aqueous solvent, etc. No. 2,389,469. Frank Tone, Osborne Mahlman, and Fred Brown to The Carborundum Co.

Abrasive article comprising abrasive grains bonded by resinous condensation product of organic derivative of ortho silicic acid. No. 2,389,491. Ralph Dunlap and Robert Schatz to Monsanto Chemical Co.

Lubricant comprising hydrocarbon oil containing organic ester of phosphoric acid derived from long chain unsaturated alkyl phenol present in oils extracted from Anacardium genus of Anacardiaceae family. No. 2,389,513. Lebbeus Kemp, Jr. to The Texas Co.

Mixed base, anhydrous grease consisting of mineral oil and soaps of barium, magnesium and metal of calcium and strontium, said magnesium soap being present to produce a thermally reversible grease. No. 2,389,523. Frank Leyda to California Research Corp.

Lubricant comprising hydrocarbon lubricating oil having incorporated oil-miscible metal salt of a sulfur-containing substituted acid of phosphorus. No. 2,389,527. Rush McCleary to The Texas Co.

Match comprising cardboard splint provided with tip of igniting composition consisting of igniter, a filler and polymerized rosin. No. 2,389,552. Arthur Sanford to Hercules Powder Co.

Purifying and cooling system for lubricating oils. No. 2,389,555. Laurence Sharples to The Sharples Corp.

** *Textiles*

Dry-spinning filaments of cellulose acetate. No. 2,387,791. Robert Hoffman to E. I. du Pont de Nemours & Co.

Handling fabric during screen printing comprising coating stationary screen printing table with waxy adhesive coating, placing upon coating fabric to be printed. No. 2,387,984. Arnold Eddy, one-half to Hilda Striker.

Manufacturing filaments, yarns, of polyvinyl alcohol wherein polyvinyl alcohol is coagulated in aqueous solution of ammonium sulfate to form coagulated polyvinyl alcohol structure containing residual ammonim sulfate, which comprises washing polyvinyl alcohol structure free of ammonium sulfate with solution of acetone and water. No. 2,388,325. Ray Houtz to E. I. du Pont de Nemours & Co.

Conditioning cellulose organic derivative textile yarn to render yarn amenable to textile operations which comprises applying lubricating composition containing compound having formula $C_nH_{2n-1}CN$ where n is 7 to 19 carbon atoms. No. 2,388,826. John Caldwell to Eastman Kodak Co.

Conditioning textile yarns comprising organic derivative of cellulose to render yarn amenable to textile operations which comprises applying lubricating and anti-static composition containing a carboxylic amide. No. 2,388,833. Joseph Dickey and James McNally to Eastman Kodak Co.

Increasing resistance to sodium carbonate and other mild alkaline solutions of hardened artificial textile fibers obtained from casein which consists in soaking fibers in aqueous solution containing salt taken from zinc salts and cadmium salts. No. 2,389,015. Robert Wormell to Courtaulds Ltd.

Making a fabric comprising making at least two types of activatable yarns comprising mixture of potentially adhesive filaments with non-adhesive filaments. No. 2,389,120. Carl Castellan to American Viscose Corp.

Pressing cloth comprising piece of closely woven fabric having firm lower garment contacting surface, having its upper surface treated with waterproofing material stable under heat of a pressing iron. No. 2,389,216. Alva Smith to The Sunlite Mfg. Co.

Printing paste for textile of cellulosic nature, comprising alkali metal salt of a sulfuric acid ester of a leuco-vat-dyestuff, oxidizing agent, agent capable of splitting off acid and catalyst and containing volatile organic base, allowing production of deeper and fuller shades on textiles by short steaming process. No. 2,389,245. Alexis Wiazmitinow to Sandoz A. G.

** *Water, Sewage, and Sanitation*

Distilling water vapor from impure water which comprises subjecting vapor to cooling action of fluid under pressure and then directing fluid from zone of low velocity to zone of high velocity to create partial vacuum. No. 2,388,328. George Jacocks to Heat Transfer Products, Inc.

Treating sewage and like wherein raw liquid has been subjected to clarification and purification for removing heavy matter and other settleable solids. No. 2,388,795. John Montgomery and Louis Livingston to Lakeside Engineering Corp.

Apparatus for combustion of sewage sludge or other moisture containing matter. No. 2,389,077. Adolphe Peterson and Clifford Raiter.

Sewage solids cutting and straining device comprising semi-cylindrical grid to be interposed across a flowing stream of sewage, etc. No. 2,389,306. Walter Green to Infilco Inc.

In a sewage purification stream, a channel, submerged transverse weir plates separating channel into plurality of tanks, etc. No. 2,389,357. Llewellyn Griffith.

* *Agricultural*

Rice starch, the granules of which have a coating of flavoring material and an anti-heat shocking agent. No. 2,389,770. Kenneth Gaver to the Ohio State University Research Foundation.

Treating soil, comprising distributing on soil and working therein dry granular coke produced by partially thermally desulphurizing a sulphuric acid sludge. No. 2,390,264. Albert Mohr to Stauffer Chemical Co.

Treating soil to kill vegetation and prevent new growth, comprising wetting soil with liquid comprising: arsenic trioxide AS_2O_3, sodium hydroxide NaOH, water glass, commercial, water. No. 2,391,299. Colton De Laney to California Spray-Chemical Corp.

* *Biochemical*

Producing fat-soluble vitamin concentrates, which comprises admixing antioxidant for vitamins A and D with fat-soluble vitamin-containing marine oil, saponifying marine oil, etc. No. 2,389,955. Loran Buxton to National Oil Products Co.

Fractionating proteins from blood plasma. No. 2,390,074. Edwin Cohn to Research Corp.

Preparation of calcium pantothenate. No. 2,390,499. Gustaf Carlson and Sidney Safir to Lederle Laboratories, Inc.

Non-crystallizable sirup, comprising reaction product of starch, and alcohol, in contact with acid catalyst and water. No. 2,390,507. Sidney Cantor to Corn Products Refining Co.

Extraction of phosphatides, free fatty acids, and the like from glyceride oils. No. 2,390,528. Stephen Freeman to Pittsburgh Plate Glass Co.

Dicarboxylic acid derivatives of lower alkyl ethers of vitamin B_6, and a process of preparing same. No. 2,390,593. **John Keresztesy and Joseph** Stevens to Merck & Co., Inc.

Removing bitter taste principles from vitamin B complex concentrates prepared from natural sources which comprises extracting aqueous cereal concentrate free from water-insoluble gummy constituents with water-insoluble organic fat solvent. No. 2,390,679. Aaron Arnold and Carl Schreffler to National Oil Products Co.

Apparatus for manufacturing vinegar, combination of fermenting vessel having vapor outlet at top, external circulation conduit connected with lower part of fermenting vessel, etc. No. 2,390,717. Ernst Knebel.

Obtaining bulk of plasma from blood in single treatment, comprising mixing untreated blood with anti-coagulant and ethyl cellulose, etc. No. 2,390,727. Maurice Nesset to Baxter Laboratories, Inc.

Refining animal and vegetable oils, which comprises subjecting dry mixture containing neutralized oil and soap stock to centrifugal separation in presence of hydrating agent containing a soap selected from rosin and naphthenic acid soaps. No. 2,390,990. Benjamin Clayton to Refining, Unincorp.

* *Ceramics*

Storage battery of lead-acid type having incorporated in one of its elements a nickel-containing glass in contact with and soluble in battery electrolyte. No. 2,389,832. Francis Williams and Joseph Orsino to National Lead Co.

Glass composition comprising P_2O_5, Al_2O_3, B_2O_3, ZnO + MgO + BaO, and Na_2O. No. 2,390,191. John Stanworth to General Electric Co.

Production of Portland cement which normally includes preparing aqueous slurry of unburned siliceous material proportioned for burning in cement kiln, etc. No. 2,390,225. Laurence Sherman and Charles Bartels to National Oil Products Co.

Pressing powdered glass, which comprises coating particles by moistening with solution containing cellulose nitrate and oxidizing agent, etc. No. 2,390,354. Charles Clapp to Corning Glass Works.

Glaze composition for decorating glassware comprising lead borosilicate type of glaze containing as smelted in constituent a substance of class of zirconium tetrafluoride, and zirconyl fluorides richer in fluorine. No. 2,390,366. Carl Harbert and William Morris to The Harshaw Chemical Co.

Strand composed of long, fine, attenuated glass fibers, and adhesive and lubricating coating containing organo-siloxane to bond individual fibers together in strand form. No. 2,390,370. James Hyde to Corning **Glass Works.**

Manufacturing optical lenses comprising mechanically abrading glass stock piece at surface portion thereof, reducing and clearing abraded surface by reaction of abraded glass with mixture of hydrofluoric acid and concentrated sulphuric acid and water, etc. No. 2,390,404. Victor Walker.

Processing barium containing glass stock piece to provide finished surface of optically regular and light transmissive form. No. 2,390,405. Victor Walker to AlnCin, Inc.

Refractory coating material comprising zirconium silicate and titanium oxide in suspension with bentonite and dextrin in presence of water and methylated spirit. No. 2,390,765. Henry York and William Dummett; said Dummett to said York.

Cooling a hot glass article, which comprises applying to article a coolant consisting of gaseous fluid and liquid. No. 2,390,910. William Aksomitas to Hartford-Empire Co.

Extruding acid-activated montmorillonite clay. No. 2,391,050. Lee Van Horn to Filtrol Corp.

Producing palleted acid activated sub-bentonite montmorillonite clay. No. 2,391,312. Frederick Ewing, Robert Secor, and John Warner to Filtrol Corp.

* *Coatings*

Surfacing composition containing solid granular ethyl cellulose having ethoxy content between 46.8 and 48.5 per cent dispersed in liquid vehicle containing material selected from drying vegetable oils, semi-drying vegetable oils, and alkyd resins modified. No. 2,389,708. John Zolad to E. I. du Pont de Nemours & Co.

Luminescent coating material comprising vehicle, luminescent pigment and partial ester of a monocarboxylic acid and a polyhydroxy substance, said partial ester functioning to retard adverse effect of moisture and light on luminescent pigment. No. 2,389,781. Sampson Isenberg to General Luminescent Corp.

Wrinkle coating composition comprising resin resulting from reaction of glycerol, phthalic anhydride, and fatty acids; top drier; and hydrocarbon diluent. No. 2,389,794. Enrique Luaces to New Wrinkle, Inc.

Wrinkle coating from nonconjugated oils. No. 2,389,795. Enrique Luaces to New Wrinkle, Inc.

Coating composition comprising tough and strong resin, formed by reaction of phthalic anhydride, glycerol and drying oil fatty acids, dissolved in liquid hydrocarbon solvent with 1 to 5 carbon atom mononitroparaffin present to reduce viscosity of composition. No. 2,389,837. Charles Bogin to Commercial Solvents Corp.

Coating composition comprising solution in organic solvent of (1) a soluble fatty oil-modified alkyd resin and (2) a fusible, soluble resin obtained by heat reacting, under alkaline conditions, a 1-aryl substituted guanazole with aldehyde. No. 2,389,896. Gaetano D'Alelio and James Underwood to General Electric Co.

Lacquer compositions having nitrocellulose base, of reduced tendency to gel or discolor, containing bronze powder or copper powder to which is added powdered metal having higher electrode potential than copper. No. 2,390,217. Joseph Krieger.

Producing coating composition which comprises oxidizing surface of pellet of particles of cyclized rubber, milling oxidized pellet and antioxidant and dispersing milled product in solvent. No. 2,390,422. Clarence Carson to Wingfoot Corp.

Varnish composition comprising mixture of drying oil and resin constituting copolymer of mixture of drying oil and diene hydrocarbon. No. 2,390,530. Howard Gerhart and Leon Adams to Pittsburgh Plate Glass Co.

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* *Continued from Vol. 580, No. 4, Vol. 581, Nos. 1, 2, 3.*

Imparting to surface of article a bright metallic appearance which includes applying baking lacquer under-coating comprising urea-formaldehyde and a colored pigment of selected shade, then applying second coating comprising mixture of pearl essence, clear lacquer and lacquer thinner, etc. No. 2,390,758. Eric Wahlberg to Electrolux Corp.

Applying protective corrosion- and tarnish-resisting coating to surfaces of members, which comprises making member to be protected the cathode in electroplating bath, containing salts of metals selected from beryllium and aluminum, ammonium hydroxide, and boric acid. No. 2,390,791. George Jernstedt to Westinghouse Electric Corp.

Production of water dispersions of drying oils, varnishes, and lacquers. No. 2,391,041. Paul Stamberger.

Protective coating composition comprising oleaginous, film-forming and drying vehicle pigmented with pure anhydrous opaque white lead silicate pigment physico-chemically reactive with said vehicle. No. 2,391,118. Louis Barton.

* *Dyestuffs*

Substantive azo dyestuffs. No. 2,390,152. Ernst Keller to J. R. Geigy A. G.

Copper complexes from disazo dyes. No. 2,390,480. Byron West to American Cyanamid Co.

Metallizable triazine azo dyestuffs. No. 2,391,164. Otto Kaiser to Society of Chemical Industry in Basle.

* *Equipment*

Filling body composed of tubular, straight open-ended channel elements to be loosely dumped into reaction spaces, such as tower spaces, to provide a passage for flowing media undergoing interactions. No. 22,696. Herman Frischer.

Flow indicator in combination with duct through which stream of fluid is adapted to flow, comprising rotatable member extending into duct. No. 2,389,603. Lewis Dollinger to Dollinger Corp.

Apparatus for removing stones from suspension of lighter solids in a liquid moving through a hydraulic flume. No. 2,389,611. Avery Clark and Harry Hooper to The Great Western Sugar Co.

Assembly for analyzing gases comprising scrubbing means, evacuating means including mercury diffusion pump and a mechanical pump, first conduit and second conduit connecting scrubbing means with diffusion pump, a stop-cock controlling flow, etc. No. 2,389,706. Philip Williams and Monroe Kriegel to Standard Oil Development Co.

Separator for materials containing large and small cohered particles comprising blower for providing laterally directed stream of air, etc. No. 2,389,966. John Erickson.

Apparatus and method for washing gels. No. 2,389,973. William Gabeler to The Davison Chemical Corp.

Device for stirring and measuring temperatures of melts, which comprises horizontally reciprocable support, rotatable eccentric means for reciprocating said support, stirring means including temperature measuring means, etc. No. 2,390,052. Hans Bernstoff and Albert Allendorfer.

Electrolysis of fused baths in cell having cathode, anode, diaphragm and cathode stream of electrolyte circulating in bath in form of loop. No. 2,390,114. Robert McNitt.

Apparatus for purifying a light metal recovered from fused salt bath. No. 2,390,115. Robert McNitt.

Casting cell for casting polymerizable liquid material comprising top and bottom cell walls of rigid material, fluid-tight, collapsible tubing containing fluid under pressure separating walls and forming side walls of cell, and means for releasing fluid. No. 2,390,129. Samuel Shobert to Marco Chemicals, Inc.

Cylindrical filter for gas purification, comprising perforate inner tubular wall and outer perforate tubular wall forming shell, homogeneous fiber filler, etc. No. 2,390,297. Harry Gilmore to Aget Manufacturing Co.

Method and machine for making capsules, particularly gelatin capsules. No. 2,390,337. Chester Spotz.

Filtering apparatus. No. 2,390,494. Southwick Briggs and Walter Bauer; said Bauer to Briggs Clarifier Co.

Device for testing strength of adhesion between adhesively bonded layers of a test specimen. No. 2,390,510. Clarence Chatten.

Gas-check pad comprising core member consisting of compressed baked shredded mass of asbestos fibers and non-volatile, heat-polymerized oil. No. 2,390,525. Charles Egan.

In filter press, a filterpress plate having outer frame and drainage grid removably mounted within said frame, etc. No. 2,390,628. Paul Van Winkle to George B. Finnegan, Jr., as trustee.

Pulverizing and separating frangible material from partially comminuted mixture of said frangible material and less frangible material. No. 2,390,678. Norwood Andrews to International Pulverizing Corp.

In reaction furnace, an enclosure, a metal retort tube supported within enclosure and having portion extending therefrom, bath submerging said tube, said bath comprising molten sodium silicate. No. 2,390,698. Elbert Ensign and Frank Shaub to Ford Motor Co.

In filter for treating moving fluids, combination of vertically disposed cylindrical chamber having removable cover and with tangentially disposed inlet for fluid to be filtered, etc. No. 2,390,841. Eric Longden.

Apparatus for mixing and dispensing fluids of different densities including cylinder for dispensing under pressure a mixture of liquids differing widely in volatility. No. 2,390,871. Donald Conway to American Utilities Corp.

Mineral separating and sizing device. No. 2,391,029. Peter Minichello, one-half to Michael Valenzano.

Poppet changeover for liquefied gas systems. No. 2,391,043. Theodore St. Clair to Phillips Petroleum Co.

Low pressure vapor generator comprising a casing, a plurality of shallow superposed water pans supported therein in vertically spaced relation, etc. No. 2,391,071. William Price.

In colorimeter which has light affected meter, means for acting on sample holder to position and releaseably retain holder in predetermined location on platform in alignment with aperture and in path of light-beam. No. 2,391,076. Daniel Stevens.

Apparatus for liquid treatment of fibrous material comprising perforate conveyor means, track on which conveyor is supported adjacent its sides for movement along track, means for applying liquid to fibrous material on conveyor means, etc. No. 2,391,096. Edward Knight to American Viscose Corp.

Contacting device for fluid substances comprising elongated tubular shell provided with inlet means and outlet means, plurality of bushings of differing widths spaced in shell, etc. No. 2,391,110. James Walker to Standard Oil Development Co.

Shipping container for high-gravity materials comprising tubular body composed of paper-like stock devoid of any interior shelf or shoulder, a two-diameter rigid lid, etc. No. 2,391,212. Francis Williams and Morris Kaplan, said Williams to National Lead Co.

Reactor comprising cylindrical shell, plurality of annular trays disposed in spaced superimposed relation within said shell, etc. No. 2,391,315. William Hulsberg to Universal Oil Products Co.

* *Explosives*

Explosive composition comprising nitroglycerin and absorbent material consisting of metal starchate compound selected from alkali metal starchate and ammonium starchate. No. 2,389,771. Kenneth Gaver to The Komel Corp.

Apparatus for transporting liquid explosive nitric ester, which apparatus comprises plurality of open vessels positioned at descending levels, etc. No. 2,391,006. George Bryce and Vernon Williams to Imperial Chemical Industries, Ltd.

* *Food*

Treatment of edible liquid selected from liquids of animal and vegetable origin to inhibit detrimental bacterial action which comprises: incorporating in liquid, small amount of taka-diastase. No. 2,389,732. John Kellogg to John L. Kellogg & Co.

Canning green vegetables while preserving color and firmness by process involving blanching in hot water and alkaline treatment at lower temperature. No. 2,390,468. Walter Schroder and Thomas Rogers, deceased, by Edith Rogers, executrix.

Pasteurizing milk containing enzyme phosphatase and Escherichia coli. No. 2,390,872. Arthur Dahlberg and Robert Holland to Cherry-Burrell Corp.

Water carbonating device in combination a fluid container, a water supply inlet and a gas supply inlet, and a rotary agitator, etc. No. 2,391,003. Wade Bowman to Frostidrink, Inc.

Drying hygroscopic plastic molasses comprising flowing it onto heated drying surface and forming thin film of said molasses thereon, etc. No. 2,391,033. Robert Northcutt and Robert Northcutt, Jr., to Food Concentrates, Inc.

* *Inorganic*

Treating acidulous aqueous solution of ferrous sulphate containing free sulphuric acid to produce iron and solution of ferric sulphate. No. 2,389,691. Erwin Schumacher and George Heise to National Carbon Co., Inc.

Recovering elemental sulphur from sulphurous gases. No. 2,389,810. William Odell and Wiliam Harbert to Lion Oil Refining Co.

Manufacture of magnesium compounds wherein neutral magnesium carbonate is precipitated from magnesium bicarbonate solution. No. 2,390,095. Gunter Gloss to Marine Magnesium Products Corp.

Removing impurities from alkaline gelatinous hydroxides. No. 2,390,272. August Riesmeyer and Vernon Stowe to Aluminum Co. of America.

Reconditioning weak solutions of sulfuric acid containing carbonaceous material. No. 2,390,316. Henry Mottern to Standard Oil Development Co.

Hydrolyzing mixture of silicon halides including methyl silicon halides and containing halogen atoms attached directly to silicon to form insoluble gels when mixed directly with water. No. 2,390,378. James Marsden to General Electric Co.

Making disodium phosphate dihydrate. No. 2,390,400. George Taylor to Monsanto Chemical Co.

Apparatus for preparation of chlorine dioxide by contact of solution of solution of chlorate with acid reactant. No. 2,390,432. Cyril Evans.

Dry grinding fuller's earth to control distribution of particle sizes for use as decolorizing filter aid in reclamation of dry cleaning fluid. No. 2,390,490. Thomas Atwell to Floridan Co.

Producing oxygen by electrolyzing aqueous solution between anode and cathode, improvement which comprises continuously depolarizing cathode with oxygen to prevent evolution of hydrogen, and promptly electrolyzing at anode product of such cathodic depolarization. No. 2,390,591. Milton Janes to National Carbon Co., Inc.

Manufacture of sulphamic acid. No. 2,390,648. Donald Hill and George Peirce to E. I. du Pont de Nemours & Co.

Forming rectifying surface on selenium which comprises annealing selenium below its melting point, immersing selenium surface in boiling water and thereafter in boiling solution of alkali hydroxide. No. 2,390,771. Wayne Blackburn to Westinghouse Electric Corp.

Stabilized solutions of metallic salts comprising water insoluble drier soap of metal of class of heavy metals and alkaline earth metals, sorbitol, and non-polar solvent. No. 2,390,830. Stanley Elliott to Ferro Enamel Corp.

Making carbon black consisting in directing streams of oxygen containing gaseous combustible substance adjacent to inner sides of boundary walls of combustion chamber, etc. No. 2,391,067. Percival Mitchell to Albert Ransom.

Preparing mixture of monobasic lead salicylate and other insoluble lead salt. No. 2,391,166. Leonard Kebrich to National Lead Co.

Improving current rectification properties of selenium in selenium rectifiers that comprises forming layer of sodium aluminate and sodium and aluminum hydroxides on one surface of selenium. No. 2,391,194. David Rau and Carl Peters to B. L. Electric Co.

Manufacture of tartar emetic by reacting aqueous solution of potassium bitartrate with solid antimony oxide. No. 2,391,297. Newell Davies to Stauffer Chemical Co.

Continuous recovery of SO_2 from sulphuric acid sludge containing hydrocarbonaceous material. No. 2,391,328. Albert Mohr to Stauffer Chemical Co.

* *Medicinal*

Content material surrounded by tanned gelatin envelope which has dispersed throughout alkali metal salt of cellulose acetate phthalate to render envelope responsive to intestinal secretions to release content substance while resisting dissolution in acid stomach secretions. No. 2,390,088. Sereck Fox and Laurene Opferman to Gelatin Products Corp.

Antispasmodic agent, a di-N-substituted aminoethyl ester of diphenylthioacetic acid. No. 2,390,555. Andrew Richardson to William P. Poythress & Co., Inc.

Stable therapeutically active aqueous solution of ergot alkaloids which comprises water, water-soluble organic acid salts of alkaloids of ergot, and thiourea. No. 2,390,575. Clair Dyas to Lederle Laboratories, Inc.

Physiologically active alkaloids from erythrina species. No. 2,391,013. Karl Folkers and Frank Koniuszy to Merck & Co., Inc.

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Product having physiological activity of curare and consisting of total chloroform-soluble "free" alkaloidal fraction obtained from species of Erythrina, and which is free from "combined" alkaloids and "liberated" alkaloids. No. 2,391,014. Karl Folkers to Merck & Co., Inc.

Substance selected from alkaloid erysonine, which is identical with alkaloid, having same characteristics obtained from species of erythrina, etc. No. 2,391,015. Karl Folkers and John Shavel, Jr., to Merck & Co., Inc.

* *Metallurgy, Ores*

Beneficiating low grade iron ores containing silicious gangue by froth flotation. No. 2,389,727. Earl Herkenhoff to American Cyanamid Co.

Production of iron deposits for use as iron powders. No. 2,389,734. Ernest Mehl.

Concentrating ores by froth flotation, which comprises adding to aqueous flotation medium a higher molecular weight aliphatic carboxylic acid ester of an hydroxyalkyl non-tertiary amine. No. 2,389,763. Frank Cahn to The Emulsol Corp.

Producing stainless steel strip which consists in coating hot rolled strip prior to annealing with aqueous solution containing sodium chloride and sodium fluoride, and then annealing coated strip in reducing atmosphere, to promote increased scale formation. No. 2,389,838. Alfred Bromberg.

Electrode rack for suspending batch of separated articles in an electrolytic bath. No. 2,389,904. Frederick Hampson to Plating Processes Corp.

Briquetting mixture of calcined dolomite and ferro-silicon for production of magnesium. No. 2,390,016. Irwin Wagner, Luther Fetterolf, Robert Waring, and George Mahler to The New Jersey Zinc Co.

Enhancing inherent aging characteristic of carbon-containing chromium-nickel stainless steel of type containing stronger-than-chromium carbide formers such as titanium, columbium, zirconium, etc. No. 2,390,023. Ernest Wyche to Carnegie-Illinois Steel Corp.

Heat treating and quenching articles of aluminum-magnesium alloys to obtain high resistance to stress corrosion and high tensile properties. No. 2,390,238. Walter Dean to Aluminum Co. of America.

Electropickling and electropolishing of metal articles in electropolishing sulphuric acid-hydrofluoric acid-water electrolyte. No. 2,390,282. Sam Tour and Albert Howe, to said Tour.

Making deep drawing steel comprising blowing blast furnace iron having silicon content between .90% to 1.25% and manganese content between .90% to 1.30% and minimum of .25% phosphorus in converter to produce blown iron of 1.00% to 2.50% carbon and more than .010% nitrogen. No. 2,390,346. Clyde Bayer and Charles Carr to National Steel Corp.

Improving appearance and resistance to corrosion of stainless steel containing 18 percent chromium and 8 percent nickel which comprises immersing steel, after first being pickled, in aqueous solution of hydrochloric acid containing quinolin ethiodide. No. 2,390,402. Herbert Uhlig to General Electric Co.

Lead coating articles made of nickel and nickel alloys without cleaning and removal of hot rolled oxide surface, comprising pretreating uncleaned articles in molten flux bath containing iron salt from ferric chloride and ferric fluoride and zinc chloride, etc. No. 2,390,440. Eugene Kalil to The International Nickel Co., Inc.

Producing composite metal having steel foundation layer and cladding layer of nickel-chromium-iron alloy bonded thereto. No. 2,390,452. William Mudge to The International Nickel Co., Inc.

Manufacturing metallic magnesium. No. 2,390,531. Fritz Hansgirg to Marine Magnesium Products Corp.

Extracting copper from copper ore containing acid-soluble copper values. No. 2,390,540. Cornelius Keller to The Dow Chemical Co.

Machinable heat resistant gray cast iron containing 0.05 to 0.50 per cent of boron. No. 2,390,594. Daniel Krause to Gray Iron Research Institute, Inc.

Drawing coils of metal rod into wire, which consists in dipping coils into 1 to 5 per cent aqueous solution of sodium silicate. No. 2,390,644. Karl Diehm and Leonard Crewe to Bethlehem Steel Co.

Preparation of compounds of tungsten and similar metals from their ores and residues. No. 2,390,687. Gideon Boericke and Edward Boericke; said Edward Boericke to said Gideon Boericke.

Zinc base alloys containing copper, silicon and arsenic. No. 2,390,689. Edward Bunn to Revere Copper & Brass, Inc.

Electrode comprising foundation of alloy containing chromium and metal of iron group, oxidized alloy film of which part is chromic oxide on surface and which produces interference colors, and a coating having ratio of secondary electron emissivity greater than unity and comprising alkali metal condensed on surface of film. No. 2,390,701. Warren Ferris to Radio Corp. of America.

Brazing alloy consisting of 0.5 per cent to 2 per cent silver, 1 per cent to 3 per cent tin, 6.5 per cent to 7.5 percent phosphorous, and balance copper. No. 2,390,775. Joseph Christ to Westinghouse Electric Corp.

Making metallic articles comprising spraying low carbon steel to deposit and form spray metal article having a porous structure, heating sprayed steel in reducing atmosphere to reduce any oxides present, applying brazing metal selected from copper and copper base alloys. No. 2,390,805. James Merryman and Edward Wharff, Jr., to Westinghouse Electric Corp.

Recovering chromium from low grade chromite ore. No. 2,390,970. Marvin Udy.

Producing thick non-porous silver plate by electro-deposition on metal article which comprises pretreating article by plating with thin layer of nickel and silver strike mounting article for rotation as cathode and circulating electrolyte over cathode, said electrolyte consisting of silver cyanide, potassium cyanide, potassium carbonate and potassium hydroxide. No. 2,391,039. Ralph Schaefer to The Cleveland Graphite Bronze Co.

Apparatus for extracting metal in vapor state from material bearing such metal. No. 2,391,156. Fritz Hansgirg to The Anglo Califorina National Bank of San Francisco.

Production of metallic magnesium by reduction of magnesium oxide-containing raw material with aid of reducing agents generating non-gaseous products of oxidation. No. 2,391,193. John Rademaker to The Anglo California National Bank of San Francisco, as trustee for Reconstruction Finance Corp.

Making light-sensitive cathode which comprises forming on cathode carrier a deposit of antimony and cesium in evacuated container. No. 2,391,280. Gordon Teal to Bell Telephone Laboratories, Inc.

Bright copper plating bath comprising copper sulfate, sulfuric acid, brightener selected from aryl and alkyl substitution products of thiourea and acetyl, hydrochloride, nitrate and metal salt derivatives of thiourea, a wetting agent, and substance to permit high current densities. No. 2,391,289. John Beaver, Jr.

* *Organic*

Producing paraffinic hydrocarbons comprising heating alkyl phenol in presence of clay under acidic conditions. No. 2,389,598. Oliver Dawson to Standard Oil Development Co.

Making alkenyl cyanides wherein a beta-hydroxy-alkyl cyanide is heated in presence of a dehydration catalyst to evolve vapors comprising alkenyl cyanide and water and evolved vapors are condensed. No. 2,389,607. Edgar Britton, Howard Nutting and Myron Huscher to The Dow Chemical Co.

Synthesizing compound from vinyl halide and **hydrocarbon-substituted** vinyl halide. No. 2,389,626. Wilbur Lazier to Du Pont Co.

Separating butadiene in more concentrated form from mixture containing same, in which mixture is contacted in liquid phase with reagent comprised of a solid dry monovalen salt of a metal selected from copper, mercury and silver. No. 2,389,647. Frank Soday to The United Gas Improvement Co.

Segregating and concentrating butadiene which comprises contacting hydrocarbon fraction containing 4 carbon atoms to molecule and butadiene with cuprous chloride solution consisting of cuprous chloride, formamide, hydrochloric acid and water, etc. No. 2,389,658. Egi Fasce and Louis Pirkle to Jasco, Inc.

Di(methylhexyl) dithiophosphoric acid salt of phenyl biguanide. No. 2,389,718. Arnold Davis to American Cyanamid Co.

Producing calcium citrate from citrus fruit. No. 2,389,768. Gordon Cole to California Fruit Growers Exchange.

Converting ethylene into butylene which comprises reacting ethylene in presence of a calcined composite catalyst comprising silica metallic zinc, alumina and zirconia. No. 2,389,780. Vladimir Ipatieff and Vladimir Haensel to Universal Oil Products Co.

Recovering styrene from styrene-containing hydrocarbon mixture resulting from pyrolysis of hydrocarbons. No. 2,389,793. John Livingston to Monsanto Chemical Co.

Forming styrene directly from ethyl cyclohexane by dehydrogenating the latter. No. 2,389,801. William Mattox to Universal Oil Products Co.

Stabilizing organo-siloxane which comprises incorporating therein phenyl amine selected from phenyl-2-naphthylamine, 2,4 diamino diphenyl amine, etc. No. 2,389,802. Rob McGregor and Earl Warrick to Corning Glass Works.

Stabilizing organo-siloxane which comprises incorporating therein alkoxy phenyl amine selected from 4-isopropoxy diphenyl amine and 4,4' dimethoxy diphenyl amine. No. 2,389,803. Rob McGregor and Earl Warrick to Corning Glass Works.

Stabilizing organo-siloxane which comprises incorporating therein polyhydroxy benzene selected from 3-methyl cathechol, t-butyl catechol, cyclohexyl catechol, pyrogallol, etc. No. 2,389,804. Rob McGregor and Earl Warrick to Corning Glass Works.

Stabilizing organo-siloxane which comprises incorporating therein hydroxy aromatic amine selected from p-amino-phenol, p-hydroxy-N-monobenzyl, aniline, ect. No. 2,389,805. Robert McGregor and Earl Warrick to Corning Glass Works.

Stabilizing organo-siloxane which comprises incorporating therein naphthol selected from class consisting of alpha-naphthol and beta-naphthol. No. 2,389,806. Rob McGregor and Earl Warrick to Corning Glass Works.

Stabilizing organo-siloxane which comprises incorporating therein aliphatic amine selected from triamyl amine and ethyl phenyl ethanolamine. No. 2,389,807. Rob McGregor and Earl Warrick to Corning Glass Works.

Preparing basic soap of a metal of which hydroxide is water-insoluble. No. 2,389,873. Harold Schiller to Socony-Vacuum Oil Co., Inc.

Preparing an organo-silicon compound which comprises introducing powdered mixture of silicon and metal catalyst into hot reaction zone, and fluidizing powder with hydrocarbon compound. No. 2,389,931. Charles Reed and Jerome Coe to General Electric Co.

Production of glutaric acid which comprises adding delta-hydroxyvaleric aldehyde to nitric acid, nitric acid containing, to reduce induction period of reaction, sodium nitrite. No. 2,389,950. John Bremner, Robert Stanley, David Jones, and Arthur Taylor, to I. C. I., Ltd.

A gamma-carboxy-pimelic acid. No. 2,390,024. Herman Bruson to The Resinous Products & Chemical Co.

Ester products of 12-hydroxystearic acid. No. 2,390,027. Melvin Hunter to The Dow Chemical Co.

Preparing ester of acrylic acid from a diester of formula shown in patent. No. 2,390,028. Harry Neher and Stanton Kelton, Jr., to Rohm & Haas Co.

Substituted 1,3,5-triazinyl-(6)-amino-phenyl-arsenic compounds. No. 2,390,089. Ernst Friedheim.

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Substituted 1,3,5-triazinyl-(6)-amino-phenyl-arsenic compounds. No. 2,390,092. Ernst Friedheim.

Production of lactonitrile acetate by reacting hydrocyanic acid with vinyl acetate in presence of alkaline catalyst, comprising adding acetaldehyde to reaction mixture. No. 2,390,098. Virgil Hansely and John Bristol to E. I. du Pont de Nemours & Co.

Reacting ethylene and a sulfhydryl compound of group consisting of hydrogen sulfide, methyl mercaptan, and ethyl mercaptan. No. 2,390,099. Jesse Harmon to E. I. du Pont de Nemours & Co.

Preparing carboxylic anhydride comprising reacting a monocarboxylic acid having dissociation constant greater than that of formic acid with hydrogen cyanide and a hydrogen halide other than hydrogen iodide. No. 2,390,106. Vernon Krieble and Robert Smellie.

Monoazo compounds. No. 2,390,113. James McNally and Joseph Dickey to Eastman Kodak Co.

Preparing alkyl lactates comprising mixing aliphatic alcohol, strong mineral acid, and member of alkali metal lactates and alkaline earth metal lactates, suddenly subjecting mixture to flash vaporize volatile components. No. 2,390,140. Samuel Weisberg and Edwin Stimpson and Alfred Miller to Sealtest, Inc.

Imine condensation process. No. 2,390,165. Ludwig Orthner, Wilhelm Luce, and George Wagner.

Production of cellulose acetate-stearate. No. 2,390,185. George Seymour and Blanche White to Celanese Corp. of America.

Sulphonyl compounds and processes for their production. No. 2,390,253. Clyde Henke to E. I. du Pont de Nemours & Co.

Hydrogenating a lower alkyl ester of phenyl-alpha-hydroxymethylane acetic acid in presence of Raney nickel. No. 2,390,278. Meyer Sletzinger and Grover Paulsen, Jr., to Merck & Co., Inc.

* *Continued from Vol. 580, No. 4, Vol. 581, No. 1, 2, 3*

From Official Gazette—Vol. 581, No. 4—Vol. 582, Nos. 1, 2, 3 (Dec. 25-Jan. 15)—p. 656

Reacting racemic alpha-hydroxy-beta-beta-dimethyl-gamma-butyrolactone with brucine in inert, neutral liquid solvent and removing brucine-l-lactone complex formed. No. 2,390,281. Max Tishler and Ralph Beutel to Merck & Co., Inc.

Allyl and substituted allyl methacrylates. No. 2,390,326. Chessie Rehberg and Charles Fisher to Secretary of Agriculture of the United States of America.

Allyl and substituted allyl acrylates. No. 2,390,327. Chessie Rehberg and Charles Fisher to Secretary of Agriculture of the United States of America.

Preparing gamma-hydroxy derivatives of normal and branched-chain alpha-beta unsaturated aliphatic acid esters, which are characterized by hydroxyl group in a methyl group attached to beta-carbon atom. No. 2,390,335. Harry Sobotka and Martin Rubin to Mount Sinai Hospital Research Foundation, Inc.

Producing acenaphthylene which comprises reacting acenaphthene and glacial acetic acid in presence of $Pb3O4$ and subjecting product to deacetylation. No. 2,390,363. Ralph Flowers to General Electric Co.

Production of para-divinylbenzene. No. 2,390,368. Carroll Hochwalt to Monsanto Chemical Co.

Sorbitan and process for making the same. No. 2,390,395. Sol Soltzberg to Atlas Powder Co.

Solid alkaline compound from alkaline-reacting alkali hydroxides, -phosphates, -carbonates and -silicates admixed with member of dimethoxy tetraethylene glycol, diethylene glycol dimethyl ether and dioxane. No. 2,390,406. Walter Wegst, Ralph McNabney and Leslie Bacon to Wyandotte Chemicals Corp.

Sulphonyl cyanamides. No. 2,390,411. George Anderson and Richard Roblin, Jr., to American Cyanamid Co.

Production of alpha-beta-dichloropropionitrile which comprises reacting anhydrous, oxygen-free chlorine with acrylonitrile in presence of visible light and in absence of oxygen and water. No. 2,390,470. John Sumner to Rohm & Haas Co.

beta-Sulpho-beta-carboxypropionoguanamine. No. 2,390,476. Jack Thurston to American Cyanamid Co.

Product of reaction of piperonyl aldehyde with an aldonic acid. No. 2,390,511. Allan Chester and Frederick Reisinger to Poor & Co.

Making trimethylethoxy silicane which comprises reacting methyl chloride with magnesium and dimethyldiethoxy silicane in ethyl ether, etc. No. 2,390,518. William Daudt to Corning Glass Works.

Making alkylene cyanohydrin which includes reacting alkylene oxide and HCN in liquid phase. No. 2,390,519. Harold Davis and Bryan Redmon to American Cyanamid Co.

Alpha-halo-beta-substituted-butyrolactone. No. 2,390,526. Robert Elderfield and Elkan Blout to Eli Lilly & Co.

Hydrazino-1,3,5-triazino derivatives of substituted phenylarsenic compounds. No. 2,390,529. Ernst Friedheim.

Separating butane-butene mixture. No. 2,390,536. Eugene Houdry and Richard Blue to Houdry Process Corp.

Neutral ester-amide of (A) an amino-hydroxy substituted hydrocarbon and (B) a half ester of carbonic acid and a monohydric alcohol. No. 2,390,551. Irving Muskat and Franklin Strain to Pittsburgh Plate Glass Co.

Obtaining dicarboxylic acid which comprises admixing water, carbon dioxide, alicyclic ketone and chromite of a hydrogenating metal whose oxide is difficultly reducible. No. 2,390,576. Mark Farlow and Gerald Whitman to E. I. du Pont de Nemours & Co.

Making phenyl-pentachlorethane which comprises heating mixture of alpha-trichloro-acetophenone and phosphorus pentachloride. No. 2,390,629. Viktor Weinmayr to E. I. du Pont de Nemours & Co.

Alkylsulphenyl dithiocarbamates. No. 2,390,713. Madison Hunt to E. I. du Pont de Nemours & Co.

Disulphanilylguanidine and process of preparing same. No. 2,390,734. Alan Pierce to American Cyanamid Co.

Ketonic rosin derivatives. No. 2,390,736. Donald Price and Everette May to National Oil Products Co.

Soluble sulphur preparations comprising reaction product obtained by heating calcium oxide, sulphur, and polyhydric alcohol. No. 2,390,746. Frank Stirn to Lederle Laboratories, Inc.

Separating butadiene from hydrocarbon mixture containing small amounts of acetylenes. No. 2,390,764. Harold Wolff to Shell Development Co.

N-methylated triethylenetetramine resulting from interaction of triethylenetetramine, formic acid, and formaldehyde. No. 2,390,766. Glenn Zellhoefer and Carl Marvel and Michael Copley to Eureka Vacuum Cleaner Co.

Production of 2,3-butylene glycol by fermenting carbohydrate solution. No. 2,390,779. Ralph Cornwell to Sylvania Industrial Corp.

Alkylating organic compound containing aromatic nucleus which comprises reacting compound with aliphatic alcohol in presence of boron trifluoride and inorganic acid anhydride selected from phosphorus pentoxide and boric oxide. No. 2,390,835. George Hennion and Norbert Toussaint to E. I. du Pont de Nemours & Co.

Alkylating organic compound containing aromatic nucleus which comprises reacting with aliphatic alcohol in presence of boron trifluoride and assistant acidic condensing agent selected from sulfuric acid and benzenesulfonic acid. No. 2,390,836. George Hennion and Norbert Toussaint to E. I. du Pont de Nemours & Co.

gamma-Nitro monocarboxylic esters. No. 2,390,918. Herman Bruson to The Resinous Products & Chemical Co.

Separating butadiene and butylene from hydrocarbon mixtures. No. 2,390,934. Charles Gregg to The Dow Chemical Co.

Ethers of alcohol amines. No. 2,390,942. Morris Katzman and Albert Epstein to The Emulsol Corp.

Producing gas containing isobutylene in high concentration from polymer liquid consisting of isobutylene-butene codimers, which comprises contacting polymer liquid with argillaceous catalyst. No. 2,390,951. Leonard Leum and Frank Ciapetta to The Atlantic Refining Co.

Refining butadiene in admixture with monovinylacetylene comprising subjecting mixture to selective hydrogenation in presence of active iron catalyst obtainable by treating iron aluminum alloy with alkaline solution to produce residue of iron powder. No. 2,391,004. Frederick Breuer to The United Gas Improvement Co.

Anthraquinone compounds. No. 2,391,011. Joseph Dickey and John Byers, Jr., to Eastman Kodak Co.

Soap making utilizing synthetic fatty acids prepared by heating high molecular weight hydrocarbon such that hydrocarbon is liquefied, with oxidation catalyst, a persalt of alkaline reacting cation and emulsion while dispersing throughout reaction mass a gas comprising oxygen and moisture. No. 2,391,019. Sabine Hirsch to Cargill, Inc.

Recovering toluene from naphtha containing toluene and non-aromatic components. No. 2,391,104. Chester Read to Standard Oil Development Co.

Production of butadiene from cyclohexane. No. 2,391,117. Charles Ayres to Phillips Petroleum Co.

Recovery of phenolic materials from waste lyes derived from caustic treatment of petroleum hydrocarbons. No. 2,391,128. Stephen Cauley and Vladimir Shipp to Socony-Vacuum Oil Co., Inc.

Monoazo hetero-oxygen compounds. No. 2,391,137. Jakob Danuser and Rudolf von Capeller to Society of Chemical Industry in Basle.

Process for alkylating arylamines. No. 2,391,137. Joseph Dickey and James McNally to Eastman Kodak Co.

Preparing ethyl benzene which comprises contacting petroleum fraction composed of hexane and cyclohexane with hydrocarbon gas rich in ethylene. No. 2,391,146. Hillis Folkins and Carlisle Thacker to The Pure Oil Co.

Reacting propane with alkylating agent in presence of catalyst consisting of hydrofluoric acid containing boron fluoride. No. 2,391,148. Frederick Frey to Phillips Petroleum Co.

Production of diolefins from mixture of pentenes comprising pentene-2 and trimethylethylene. No. 2,391,158. Harold Hepp to Phillips Petroleum Co.

Manufacturing butadiene from normal butane.. No. 2,391,160. Charles Hillman and Donald Campbell to Standard Oil Development Co.

Fluorine containing azo compounds. No. 2,391,179. James McNally and John Byers, Jr., to Eastman Kodak Co.

Sulphonamido azo pyrazolones. No. 2,391,180. James McNally and Joseph Dickey to Eastman Kodak Co.

Butadiene production. No. 2,391,188. Robert Patterson to Phillips Petroleum Co.

Converting ester of acetic acid from methyl acetate and ethyl acetate to acetic acid, which comprises heating mixture of ester of acetic acid and water under pressure, while separating by distillation alcohol formed under similar pressure. No. 2,391,219. Edward Bartlett to E. I. du Pont de Nemours & Co.

Preparing a cyclic dicarboxylic acid anhydride. No. 2,391,226. Albert Clifford and Clyde Gleim to Wingfoot Corp.

Oxidation of paraffinic hydrocarbons. No. 2,391,236. Sabine Hirsch.

Cyanhydrin acetates of pyruvic acid esters. No. 2,391,251. John Long to Wingfoot Corp.

Converting maleic anhydride to monochloromaleic anhydride which comprises chlorinating molten maleic anhydride which contains chlorination catalyst and halide of alkaline earth metal. No. 2,391,261. Charles Milone to Wingfoot Corp.

N,N'-thiobisamide. No. 2,391,267. William Peppel to E. I. du Pont de Nemours & Co.

Separating product enriched in isoquinoline from mixture containing this base and like-boiling nitrogen bases, which comprises precipitating from mixture calcium chloride addition compound of isoquinoline. No. 2,391,270. Frederick Reimers to Allied Chemical & Dye Corp.

Hydrogenation of organic compound by means of activated nickel-aluminum alloy catalyst. No. 2,391,283. Arthur Weber and Merlin Peterson to E. I. du Pont de Nemours & Co.

Stabilization of sulpholanes. No. 2,391,331. Rupert Morris and Alva Snider to Shell Development Co.

* *Paints, Pigments*

Moth repelling paint for indoor use, comprising water dispersible paint vehicle selected from animal and vegetable protein bases, said vehicle containing solid particles of volatile insecticide, consisting of naphthalene and para-dichlorobenzene. No. 2,390,887. Alan Kling, one-third to Chalmers Landrey and one-third to Galen Bloom.

* *Paper, Pulp*

High porosity flexible sheet of high tensile strength comprising fiber mesh in combination with powder having lattice skeletal crystallite structure, fiber mesh formed of undercooked sulphate wood pulp, and powder being submicroscopic silicon carbide. No. 2,389,678. Edwin Merrell to Phelps Dodge Copper Products Corp.

Non-catalytic process for hydrogenation of material selected from sodium salts of lignin obtained from waste liquors of sulphite pulp process and of sulphate pulp process, which comprises reacting material under pressure with hydrogen in aqueous alkaline medium. No. 2,390,063. Karl Freudenberg and Willy Lautsch.

* *Petroleum*

Cracking hydrocarbon gases or vapors by contact with recycled hot elements. No. 2,389,636. Charles Ramseyer to H. A. Brassert & Co.

Catalytically converting hydrocarbons by action of liquid aluminum halide-hydrocarbon complex conversion catalyst maintained in presence of hydrogen halide. No. 2,389,651. Lynn Strawn to The Texas Co.

Isomerizing normal paraffin containing at least four carbon atoms per molecule in vapor phase while in contact with aluminum halide and in presence of compound of type RSH. No. 2,389,659. Eric Fawcett and Eric Narracott to Anglo-Iranian Oil Co., Ltd.

Isomerizing normal paraffin containing four carbon atoms per molecule in contact with aluminum chloride and hydrogen sulfide. No. 2,389,660. Eric Fawcett and Eric Narracott to Anglo-Iranian Oil Co., Ltd.

Bonding bituminous material which comprises asphalt containing amino alkylamide of a carboxylic acid. No. 2,389,680. Louis Mikeska to Standard Oil Development Co.

Bituminous bonding composition comprising bituminous material, solid mineral aggregate and akyl amidine. No. 2,389,681. Louis Mikeska to Standard Oil Development Co.

Manufacture of toluene and aromatic motor fuels that comprises subjecting higher boiling petroleum stock to cracking temperature to effect conversion into lower boiling hydrocarbons and extensive conversion into aromatic hydrocarbons, etc. No. 2,389,713. Harold Atwell to The Texas Co.

Reacting hydrocarbon mixture consisting of propane and ethylene in presence of aluminum halide catalyst and hydrogen halide, etc., and recovering proportions, of isobutane and isopentane. No. 2,389,739. Ernst Pevere to The Texas Co.

Subjecting liquid hydrocarbon material, containing paraffin hydrocarbon having three to five carbon atoms per molecule and dissolved hydrogen fluoride and free from water, to first fractional distillation to produce low-boiling fraction comprising all dissolved hydrogen fluoride and paraffin to form azeotropic mixture therewith and high-boiling hydrocarbon fraction free from hydrogen fluoride, etc. No. 2,389,971. Frederick Frey to Phillips Petroleum Co.

* *Continued from Vol. 580, No. 4, Vol. 581, No. 1, 2, 3*

From Official Gazette—Vol. 581, No. 4—Vol. 582, Nos. 1, 2, 3 (Dec. 25-Jan. 15)—p. 657

Converting isoparaffins and normal paraffins of butanes and pentanes to aliphatic motor fuel stock. No. 2,389,984. Jean Jones to Phillips Petroleum Co.

Breaking petroleum emulsions of water-in-oil type, characterized by subjecting emulsion to demulsifying agent comprising basic esterified amino-alcohol. No. 2,390,078. Melvin DeGroote and Bernhard Keiser to Petrolite Corp., Ltd.

Resolving petroleum emulsions of water-in-oil type, characterized by subjecting emulsion to demulsifier, comprising sub-resinous esterification product. No. 2,390,079. Melvin DeGroote and Bernhard Keiser to Petrolite Corp., Ltd.

Resolving petroleum emulsions of water-in-oil type, characterized by subjecting emulsion to demulsifier comprising sub-resinous esterification product. No. 2,390,080. Melvin DeGroote and Bernhard Keiser to Petrolite Corp., Ltd.

Breaking petroleum emulsions of water-in-oil type, characterized by subjecting emulsion to demulsifying agent comprising basic esterified ether-aminoalcohol. No. 2,390,081. Melvin DeGroote to Petrolite Corp. Ltd.

Resolving petroleum emulsions of water-in-oil type, characterized by subjecting emulsion to demulsifier, comprising sub-resinous esterification product. No. 2,390,082. Melvin DeGroote to Petrolite Corp. Ltd.

Resolving petroleum emulsions of water-in-oil type, characterized by subjecting emulsion to demulsifier, comprising sub-resinous esterification product. No. 2,390,083. Melvin DeGroote to Petrolite Corp. Ltd.

Reforming by catalytic dehydrogenation two different types of naphtha, said types being based on differences in operating conditions required to effect given amount of dehydrogenation. No. 2,390,244. Duncan Finlayson to The M. W. Kellogg Co.

Hydrocarbon conversion process which comprises subjecting mixture containing isobutane, normal butane, and olefins to alkylation, etc. No. 2,390,285. Gordon Zimmerman to Universal Oil Products Co.

Treating sour fuel oil to increase cetane number comprising agitating first batch of sour oil with 50° Baume caustic solution in presence of oxygen, etc. No. 2,390,396. George Gilbert to Standard Oil Development Co.

Regeneration of catalyst of class of nickel and cobalt mounted on tungsten carrier, which catalyst has been converted to sulfide in refining of petroleum oil, which comprises heating sulfide in presence of steam. No. 2,390,323. Edward Peck to Standard Oil Development Co.

Using selective solvents to extract naphthenic constituents of waxy mineral oils, recovering selected paraffinic **components from extract** solutions. No. 2,390,429. Eddie Dons and Oswald Mauro to Mid-Continent Petroleum Corp.

Apparatus for extracting constitutents of waxy lubricating oils, including counterflow extractor wherein selective solvent is employed to separate heavy naphthenic extract solution from lighter waxy, paraffinic raffinate solution. No. 2,390,430. Eddie Dons and Oswald Mauro to Mid-Continent Petroleum Corp.

Catalytic cracking of partially oxidized hydrocarbons. No. 2,390,556. Robert Ruthruff.

Regenerating solid contact material which has become contaminated with carbonaceous deposits, which comprises passing contact material by gravity through regeneration zone, passing oxidizing gas through moving bed, etc. No. 2,390,708. Charles Hemminger to Standard Oil Development Co.

Separation of paraffins comprising chiefly 2,2,4-trimethylpentane from mixture of hydrocarbons containing 2,2,4-trimethylpentane and olefins. No. 2,390,720. John Latchum, Jr. to Phillips Petroleum Co.

Recovery of Petroleum from wells penetrating single underground formation from which petrpleum production has materially decreased, and wherein combustion-supporting gas under pressure is introduced to said formation at one locus, etc. No. 2,390,770. Paul Barton and Patrick to Sun Oil Co.

Removing copper compounds from copper-sweetened hydrocarbon oil which comprises treating oil with basic magnesium carbonate in solid form. No. 2,390,868. Kenneth Brown to Universal Oil Products Co.

Isomerization process which comprises subjecting saturated hydrocarbon to isomerizing conditions in presence of metallic halide catalyst of Friedel-Crafts type, a hydrogen halide and hydrogen, etc. No. 2,390,883. John Iverson to Universal Oil Products Co.

Refining petroleum hydrocarbons, which comprises bringing hydrocarbons into contact with thermally activated bauxite. No. 2, 390,917. Ferdinand Breth and Anthony Kinsel to L. Sonneborn Sons, Inc.

Well logging method which comprises dissolving in well drilling liquid a compound of sodium possessing artificial radio-activity produced by activation with alpha rays, etc. No. 2,390,931. Robert Fearon to Well Surveys, Inc.

Alkylating aromatic hydrocarbon with olefin in presence of phosphoric acid catalyst such that catalyst tends to become dehydrated, improvement which comprises adding to hydrocarbon reactants a lower aliphatic alcohol to alkylate aromatic hydrocarbon and maintain partial pressure of water vapor. No. 2,390,953. Sydney Mann to The Atlantic Refining Co.

Deleading gasoline by adding stannic chloride to gasoline containing tetraethyl lead and separating resultant precipitate. No. 2,390,988. George Calingaert, Harold Soroos and Humin Shapiro to United States of America as represented by the Executive Secretary of the Office of Scientific Research & Development.

Making motor fuel from mixture of hydrocarbon gases containing normal butylene, isobutylene and isobutane obtained from cracking of petroleum oils. No. 2,391,084. Don Carmody to Standard Oil Co.

Treatment of prime cut petroleum oils comprising contacting with catalyst consisting of bauxite in vapor phase. No. 2,391,091. Amiot Hewlett and Gerald Phillips to Standard Oil Development Co.

Separating individual unsaturated hydrocarbon of C_3 to C_8 range from complex hydrocarbon mixture. No. 2,391,102. John Patterson to Standard Oil Development Co.

Treating hydrocarbon containing organically combined fluorine to remove fluorine **therefrom.** No. 2,391,149. Frederick Frey to Phillips Petroleum Co.

Isomerizing normal paraffin. No. 2,391,189. Stephen Perry to Standard Oil Development Co.

Regeneration of mass of solid contact material by contacting with stream of hot combustion gases containing air. No. 2,391,327. Lev Mekler to Universal Oil Products Co.

Regeneration of fouled catalyst. No. 2,391,334. Edward Nicholson to Standard Oil Development Co.

Regeneration of catalyst fouled with carbon deposits. No. 2,391,336. Henry Ogorzaly to Standard Oil Development Co.

Preparing alumina hydrate catalyst composition in form of pellets of controlled size and shape, for use in catalytic reforming, which comprises forming extrudable paste by mixing finely divided alumina hydrate with aqueous solution of chromium trioxide. No. 2,391,358. William Spicer and Rhea Watts to Standard Oil Development Co.

Starting up procedure for hydrocarbon conversion unit using fluidized powdered catalyst to be circulated during conversion process in a closed cycle through reaction zone and regeneration zone for spent catalyst. No. 2,391,366. Charles Tyson to Standard Oil Development Co.

Cracking hydrocarbon oils in vapor phase in presence of suspended catalyst passed through cracking zone and regeneration zone wherein coke deposits are burned off. No. 2,391,367. Willie Hodgeson to Standard Oil Development Co.

* *Photographic*

Photographic material which comprises support, light-sensitive gelatin-silver halide emulsion and filter layer containing silver salt of a hydroxy aza-indolizine. No. 2,390,707. Newton Heimbach to General Aniline & Film Corp.

Antihalation coatings. No. 2,391,127. Emmett Carver to Eastman Kodak.

Photographic dry stripping film consisting of paper temporary support having gelatin coating, calendered wax layer, cellulose nitrate permanent support, a gelatin sub, and a sensitive emulsion layer. No. 2,391,171. Gerould Lane to Eastman Kodak Co.

Sensitive photographic element comprising support having light-sensitive emulsion layer and over said layer a layer of copolymer of methacrylic acid and alkyl methacrylate insoluble in water but soluble in alkaline photographic developing solutions. No. 2,391,181. Louis Minsk, Walter Weyerts and Wendell McDowell to Eastman Kodak Co.

Multi-layer element for silver-bleachout process of color photography. No. 2,391,198. Merrill Seymour to Eastman Kodak Co.

* *Polymers*

Polyamide comprising reaction product of a linear polymer-forming composition consisting of bifunctional amide-forming material comprising a mixture of 4-mercaptopimelic acid and diamine. No. 2,389,627. Elmore Martin to E. I. du Pont de Nemours & Co.

Obtaining synthetic linear polyamide articles of improved properties which comprises drying polyamide article to a moisture content below 0.7% by weight of polyamide, and then heating dried polyamide article while polyamide is under tension to prevent retraction. No. 2,389,655. Charles Wende to E. I. du Pont de Nemours & Co.

Synthetic linear condensation polymeric spirothioketal of tetrakis (mercaptomethyl) methane and cyclohexanedione-1,4. No. 2,389,662. Norman Fisher and Richard Wiley to E. I. du Pont de Nemours & Co.

Preparing solution of resinous intercondensation product which comprises condensing mixture of dimethylol urea with methylol ketone in presence of acidic catalyst and a lower aliphatic monohydric alcohol. No. 2,389,682. Walter Nebel to E. I. du Pont de Nemours & Co.

Polymerization of mixtures of iso-olefinic and diolefinic hydrocarbons having 4 to 6 inclusive carbon atoms with a Friedel-Crafts catalyst. No. 2,389,693. William Sparks and Robert Thomas to Jasco, Inc.

Condensation product of guanidine and starch which has been prepared by reacting guanidine carbonate and tapioca flour in presence of concentrated hydrochloric acid. No. 2,389,723. Walter Ericks and Milton Whitaker to American Cyanamid Co.

Making a coil which consists in winding paper carrying synthetic resin into a former, etc. No. 2,389,733. Edwin Lee to International Standard Electric Corp.

Making aqueous emulsions of polyisobutylene having average molecular weight above 27,000. No. 2,389,796. Gerry Mack to Advance Solvents & Chemical Corp.

Making porous ion exchange carrier resin resulting from reaction of phenol and formaldehyde in presence of alkali metal hydroxide condensing agent. No. 2,389,865. Gordon Mills and Alexander Alm to Chemical Process Co.

Preparing molding powder which comprises forming slurry of water-insoluble compound selected from thermoplastic organic acid esters and ethers of cellulose, adding solution containing plasticizer, a dye, and a solvent which is water-miscible. No. 2,389,940. John Speicher to Hercules Powder Co.

Recovering solid chlorinated polyvinyl chloride from volatile organic solvent, which comprises contacting solution with steam in hot aqueous medium containing water-soluble high molecular weight colloid. No. 2,389,958. John Crawford and Arthur Jones to I. C. I., Ltd.

Plasticizing and softening butadiene 1,3-acrylonitrile copolymer synthetic rubber-like materials which comprises admixing with materials a beta-substituted oxypropionic acid ester having structural formula shown in patent. No. 2,389,959. Russell Dean to American Cyanamid Co.

Treating polymeric vinylidene chloride. No. 2,390,035. Ralph Wiley to The Dow Chemical Co.

Polymerizing olefin to obtain high yields of polymer having viscosity not greater than that of lubricating oil, by contacting olefin with boron fluoride as catalyst while promoting activity thereof with ferrous compound. No. 2,390,100. Everett Hughes to The Standard Oil Co.

Resinous product obtained by conjointly polymerizing vinyl chloride and ester of allyl alcohol and a saturated monocarboxylic acid. No. 2,390,164. Eugene Moffett and Roy Smith to Pittsburgh Plate Glass Co.

Mastic composition comprising fibrous material, and hydrocarbon resin polymer selected from heat resin polymer and catalytic resin polymer of polymerizable hydrocarbons contained in hydrocarbon oil physically separated from tar. No. 2,390,189. Frank Soday to The United Gas Improvement Co.

Mineral fiber mass of open structure having coating thereon comprising hydrocarbon resin polymer selected from heat resin polymer and catalytic resin polymer of polymerizable hydrocarbons physically separated from tar. No. 2,390,190. Frank Soday to The United Gas Improvement Co.

Hardenable composition comprising heat hardenable condensation product of a phenol and an aldehyde not further than resol state and halogen containing interpolymerizate obtained by copolymerizing mixtures selected from vinyl chloride and maleic anhydride, vinyl chloracetate and maleic anhydride, etc. No. 2,390,198. Arthur Voss, deceased, by Hedwig Voss, administratrix, and Karl Dietz and Heinz Thomas.

Bristling and stapling articles from polymerized vinyl aromatic compounds and copolymers thereof. No. 2,390,437. Ralph Hayes to Monsanto Chemical Co.

Sulfur vulcanized composition comprising furylethylene polymer plasticized with sebacic ester and reinforced with carbon black. No. 2,390,466. Charles Mighton to E. I. du Pont de Nemours & Co.

Boot or shoe structure consisting in shoe upper material, outsole, and welt formed of waterproof plasticized vinyl resin, having characteristics

* *Continued from Vol. 580, No. 4, Vol. 581, No. 1, 2, 3*

From Official Gazette—Vol. 581, No. 4—Vol. 582, Nos. 1, 2, 3 (Dec. 25-Jan. 15)—p. 658

equivalent to Koroseal or Vinylite. No. 2,390,485. Wallace Wright to Wright-Batchelder Corp.

Solution of organic filament-forming material capable of being formed into artificial filaments, containing material by which shape may be identified comprising insoluble metal silicate. No. 2,390,512. Benjamin Collins to American Viscose Corp.

Forming article of polymeric methyl methacrylate. No. 2,390,567. William Ewart Williams.

Preparing unsaturated high molecular weight hydrocarbon polymer from saturated linear polymer having molecular weight above 1000 resulting from polymerization of olefin hydrocarbon with Friedel-Crafts catalyst. No. 2,390,621. Bernard Shoemaker and Edmond d'Ouville to Standard Oil Co.

Preparing in pulverulent form rubber-like condensation products of beta-beta-dichlorodiethyl ether and alkalie metal polysulphides. No. 2,390,853. Harold Taylor to Imperial Chemical Industries, Ltd.

Making electromagnetic cores which comprises heating sheet of magnetic material spraying one face with suspension of powdered mica in water and polyvinyl alcohol, drying out coating by expulsion of water but not polyvinyl alcohol, forming laminae, and heating stacked pile of laminae. No. 2,390,863. Merle Amidon and Harry Thornton to Western Electric Co.

Production of solidifying thickened and solid masses from esters of unsaturated fatty acids. No. 2,391,042. Paul Stamberger.

Solution for preparing polystyrene material, comprising polystyrene dissolved in solvent medium consisting of substance, selected from aromatic hydrocarbons, chlorinated aliphatic and aromatic hydrocarbons, and mixtures thereof, and alcohol which is non-solvent for polystyrene, said alcohol being selected from liquid aliphatic monohydric alcohols, polyhydric alcohols and aromatic alcohols. No. 2,391,092. William Horback to Celanese Corp. of America.

Preparing cured interpolymers of ethylene comprising subjecting mixture containing ethylene and polyolefin to interpolymerization conditions to produce interpolymer having unsaturation and physical characteristics ranging from those of viscous liquid to plastic solid, and thereafter heating interpolymer with a sulfur. No. 2,391,095. Henry Kellog and Per Frolich to Standard Oil Development Co.

Production of interpolymer of isobutylene and vinyl methacrylate which comprises subjecting mixture to action of boron trifluoride. No. 2,391,162. Denis Huebner and James Fearey to Imperial Chemical Industries, Ltd.

Manufacture of polymeric materials which comprises heating ethylene in presence of aqueous medium, a peroxy compound, and a water-soluble salt of oxy acid of sulphur with reducing properties selected from sulphites, dithionites, sulphoxylates, etc. No. 2,391,218. Reginald Bacon and Raymond Richards to Imperial Chemical Industries, Ltd.

Polymerizing a butadiene-1,3 hydrocarbon in aqueous emulsion in presence of a ketol and organic polysulfide. No. 2,391,233. Elbert Gruber to The B. F. Goodrich Co.

Producing solid terpene resin from turpentine containing polymerizable terpene unsaturates. No. 2,391,293. William Carmody to Pennsylvania Industrial Chemical Corp.

Producing solid colorless terpene polymer having molecular weight between 615 and 2200 which comprises contacting terpene selected from beta-pinene, myrcene and allo-ocimene with beryllium chloride in presence of chlorinated hydrocarbon solvent. No. 2,391,359. Harold Spurlin to Hercules Powder Co.

* *Process and Methods*

Removing suspended solids from their carrying liquid which comprises maintaining enclosed body of liquid being treated whose liquid level is subject normally to vertical fluctuations, continually supplying gas-containing liquid to liquid body and conducting such liquid to surface of liquid body, etc. No. 22,701. Earl Kelly and Arthur Kivari, Robert Kite, Elliott Roberts, and David Sutherland to The Dorr Co.

Cyclic method of controlling temperature in a refinery hydrocarbon oil processing step. No. 2,389,604. Leonard Dowding to The Texas Co.

Recovering usable thermal energy from heavy hydrocarbons, passing by gravity through sealed chamber including plurality of coking zones, etc. No. 2,390,031. August Schutte and Vernon Bowles to The Lummus Co.

Conditioning gel molds for receipt of hydraulic setting-mineral casting material, which comprises forming mold by setting action involving gelation of water-soluble colloid material selected from alginate salts, algin, pectate salts and pectin, etc. No. 2,390,138. Vance Vallandigham to Coe Laboratories, Inc.

Solubilizing water and organic solvent insoluble nitrogenous condensation product of aliphatic diamine having at least 5 carbon atoms and carbonyl compound. No. 2,390,153. Rudolf Kern.

Extracting soluble matter from particles of solid material. No. 2,390,388. Thomas Rector to General Foods Corp.

Dehydration of liquid material by subjection of same to forced evaporation and by sorption of evolved vapors in desiccant, method of heating material and cooling desiccant. No. 2,390,167. Walter Patrick, Jr., and John Elder; said Elder to Crown Cork & Seal Co., Inc.

Operation of electrolytic cells in series electric circuit in electrolysis of fused salt baths. No. 2,390,548. Robert McNitt.

Maintaining constant proportion of parts of mixture being withdrawn from closed container, which mixture comprises highly volatile liquid and nonvolatile substance. No. 2,390,694. George Coyle, Jr., to Westinghouse Electric Corp.

Scrubbing acid gases from gaseous mixtures by action of aqueous solution of monoethanolamine, improvement which consists in preventing foaming of solution by adding oleyl alcohol. No. 2,390,899. Robert Reed to The Girdler Corp.

Preparation of sols. No. 2,391,254. Morris Marshall to Monsanto Chemical Co.

Preparation of sols. No. 2,391,255. Morris Marshall to Monsanto Chemical Co.

Treating saline solution, containing chlorine and sodium dissolved therein, consisting in adding phenyl mercury hydroxide and a base exchange resin, etc. No. 2,391,258. Howard Meincke, Jr., to Howard Meincke, Sr.

* *Rubber*

Method of adhering rubbery material to smooth surfaces, including first primer coat containing finely-divided metal of particle size between 0.5 and 45 microns adhered to base member and second primer coat containing finely-divided hard material of particle size between 0.1 and 15 microns. No. 2,389,641. Donald Sarbach to The B. F. Goodrich Co.

Rubber lubricant composition remaining in emulsified state when undisturbed for extended periods of time, which consists of aqueous emulsion containing fatty acid having from twelve to eighteen carbon atoms, amino hydroxy compound selected from isobutanolamine, triethanolamine, etc., bentonite, and colloidal graphite. No. 2,389,855. Harold Johnson to Commercial Solvents Corp.

Vulcanization with diaryl guanidine addition products. No. 2,390,036. Arnold Davis to American Cyanamid Co.

Adhesion preventing material for manufacture of rubber goods, comprising mixture of bromine solution and neutral powder does not react with rubber. No. 2,390,070. John Auzin to Davol Rubber Co.

Rubber substitute comprising mixture of linseed oil, pine tar, carbon black, carbon disulphite, gum rubber, and mixture of hexamethylene tetramine and phenol. No. 2,390,829. Joseph Elder.

Disintegrating and purifying resin-containing spongy masses of crude guayule rubber which comprises agitating with mixture of volatile resin solvents containing ethyl alcohol and benzene. No. 2,390,860. Ira Borger to J. M. Huber Corp.

Polymerized rubberlike product and process of making same. No. 2,390,961. Donald Sanderson and Harry Pfaff and Murray Garrison.

Coagulating Castilloa latex comprising treating untreated Castilloa latex with dilute NH_4OH and then with dilute HCl, and heating to facilitate coagulation. No. 2,390,996. Tirey Ford to the United States of America, as represented by the Secretary of Agriculture.

Extracting unreacted acrylic nitrile from emulsifier-containing synthetic latex produced by co-polymerization process which utilizes only part of acrylic nitrile present in polymerization formula. No. 2,391,227. Albert Clifford and Charles Winans to Wingfoot Corp.

Treating rubber which comprises vulcanizing it in presence of addition product of carbon bisulfide and 1-(alpha-dimethylaminobenzyl)-naphtol-2. No. 2,391,234. Albert Hardman to Wingfoot Corp.

Uncured, rubber-like copolymer of butadiene and styrene which contains copolymer of methyl alcohol as plasticizer. No. 2,391,281. Harry Thompson to Wingfoot Corp.

Rubber-like copolymer of butadiene-1.3 with acrylonitrile, and as softening agent therefor methallyl 3-sulfolanyl ether. No. 2,391,330. Rupert Morris and Edward Shokal to Shell Development Co.

* *Specialties*

Insecticidal composition comprising alpha, alpha-di (p-chlorophenyl)—beta, beta, beta-trichlorethane and insecticidal carrier selected from group consisting of powder, solvent free from ether, and aqueous emulsion. No. 22,700. Paul Muller to J. R. Geigy A. G.

Preparing protein sheet, film and coating compositions, which comprises dispersing casein in aqueous solution containing alkylamine higher fatty acid soap. No. 2,389,605. Francis Atwood to Atlantic Research Associates, Inc.

Vapor forming, fire-extinguishing liquid comprising 2½ to 15% methylbromide, ethylbromide and ethylene chloro bromide to reduce vapor pressure to less than 25 pounds per square inch above atmospheric pressure. No. 2,389,652. Lewis Timpson.

Method of repelling carnivorous fish from cast aways in carnivorous fish infested water comprising dispersing formic acid in said water. No. 2,389,719. Alfred Dinsley.

Permanent wave liquid which comprises aqueous solution containing alkali metal hydroxide, alkali metal thiocyanate, and alkali metal sulphite No. 2,389,755. George Baker.

Carrier and applicator for treatment of trees. No. 2,389,870. Frederick Reevely.

Lubricant for metallic bearing surfaces to provide lubrication at extremely low temperatures as well as at temperatures above normal atmospheric temperature, consisting of a picoline having dissolved therein extreme pressure agent. No. 2,389,924. John Morgan to Cities Service Oil Co.

Plastic sealing cement consisting of asphaltic road oil consisting of topped Panuco crude diluted with No. 2 furnace oil, mixture being colloidally dispersed in lithium stearate. No. 2,389,926. John Morgan and Russell Lowe to Cities Service Oil Co.

Controlling organisms carried by seeds which includes applying toxic quantity of 1,2-dithiocyanoethylene. No. 2,390,037. Kenneth Nolan to American Cyanamid Co.

Typographic printing ink characterized by press-stability under humid conditions, combined with ability to be set by addition of water to film of ink, comprising solution of petroleum hydrocarbon insoluble resin derived from pine wood in a water soluble polyglycol. No. 2,390,102. Francis Jeuck and Charles Rietz to Interchemical Corp.

Typographic printing ink vehicle comprising solution of resin in solvent therefor, having film-forming agent distribute in colloidal form therethrough. No. 2,390,123. Charles Rietz and Francis Jeuck to Interchemical Corp.

Impression material yielding durable, hard-surfaced plaster forms cast in molds made thereof, which comprises soluble alginate, gel-precipitating quantity of hydrated calcium sulfate, tri sodium phosphate, magnesium carbonate, and dead-burned calcium sulfate. No. 2,390,137. Vance Vallandigham to Coe Laboratories, Inc.

Production of light polarizing bodies comprising forming solution containing light polarizing particles, causing film of solution to fall freely through enclosed zone, imposing electrostatic stress, etc. No. 2,390,162. Kurt Meyer and Hans Lapp.

Synthetic drying oil consisting of polypentaerythritol selected from dipentaerythritol, tripentaerythritol and mixtures thereof esterified with unsaturated monocarboxylic higher fatty acid. No. 2,390,202. Harry Burrell and Philip Bowman to Heyden Chemical Corp.

Nonfoaming aqueous glue stock having dispersed therein ester of fatty acid containing 8 to 22 carbon atoms per molecule with mixture of ethylene glycol polymers containing 9 ethylene oxide residues per molecule of polymer and hydrophobic extender from wax, stearic acid and insoluble metallic soaps. No. 2,390,212. James Fritz to National Oil Products Co.

Insect-repellent composition comprising isopropyl cinnamate incorporated in inert diluent. No. 2,390,249. Stanley Hall, Bernard Travis and Howard Jones to the free use of the People in the territory of the United States.

Hydraulic pressure fluid having aryl sulfonamide-formaldehyde resin, tricresyl phosphate, ester of pentaerythritol and organic acid, monoethyl ether of diethylene glycol, diethanolamine, and diamylamine phosphate. No. 2,390,258. Donald Katz and Arnulf Esterer to Hydraulic Brake Co.

Making molded composition friction or tractive-surface bodies which consists in mixing asbestos fibres with thermosetting resin. No. 2,390,266. Emil Novotny to Durite Plastics, Inc.

* *Continued from Vol. 580, No. 4, Vol. 581, Nos. 1, 2, 3.*

U. S. Chemical Patents

From Official Gazette—Vol. 581, No. 4—Vol. 582, Nos. 1, 2, 3 (Dec. 25-Jan. 15)—p. 659

Soap composition for hard water, sea-water, and acid aqueous solutions, comprising water-soluble soap and mixture of alkyl derivatives of aromatic sulfonate containing benzene nuclei in aromatic radical. No. 2,390,295. Lawrence Flett to Allied Chemical & Dye Corp.

Lubricant comprising mineral oil and compound of formula shown in patent. No. 2,390,342. David Young to Standard Oil Development Co.

Shoe stiffener comprising fabric base coated and saturated with indurated mixture of resin and wax including particles of polymerized hydrocarbon of high adhesive quality and protected by superficial indurated non-adhesive film of resin-wax mixture. No. 2,390,347. Edwin Beckwith and Adelbert Swett to Beckwith Manufacturing Co.

Vehicle in preparation of printing inks to be dried by heating films to 200-240° F., comprising solution of resin in solvent. No. 2,390,390. Charles Rietz and Francis Jeuck to Interchemical Corp.

Antifouling composition for surfaces subjected to immersion in sea water and to prevent attachment thereto of fouling marine organisms while exerting protective non-corroding action, said composition comprising as sole film forming agent water insoluble solvent-dispersed film forming organic vehicle and toxic component which is condensation product of mercuric salt and heterocyclic nitrogen base. No. 2,390,408. George Young to Stoner-Mudge, Inc.

Lubricating composition comprised of lubricating oil, lithium soap, aluminum soap, and rubber for preventing bleeding of grease composition. No. 2,390,450. John Morgan to Cities Service Oil Co.

Admixing water-soluble naturally-occurring gum with liquid water-soluble condensation product of acetone and formaldehyde. No. 2,390,481. Thomas Whitner to Chemical Laboratories, Inc.

Lubricant comprising petroleum lubricating oil wherein foaming is inhibited by acetyl ester of a sulfonated ricinoleic acid. No. 2,390,491. Harry Bennett and Jerry Marshall to Mid-Continent Petroleum Corp.

Lubricant comprising petroleum lubricating oil wherein foaming is inhibited by alkyl ester of a sulfonated ricinoleic acid. No. 2,390,492. Harry Bennett and Jerry Marshall to Mid-Continent Petroleum Corp.

Insecticide composition containing N-cyclopentenyl N-cyclohexyl amine. No. 2,390,597. George Law and John Purse to Carbide & Carbon Chemicals Corp.

As bodying agent for liquid hydrocarbons, a homogeneous multiple hydroxy aluminum soap of a mixture of organic acids, comprising naphthenic, oleic and cocoanut acids. No. 2,390,609. Arthur Minich to Nuodex Products Co., Inc.

Rodenticide containing organic thiourea. No. 2,390,848. Curt Richter to the Secretary of War of the United States of America.

Soap powder formed by mixing soap with cold water to form emulsion, then adding water heated to 180° F. then heating mixture, adding water soluble coloring and desired perfume, etc. No. 2,390,906. Edith Westerberg.

Increasing toxicity of sabadilla seed to houseflies, which consists in comminuting seed and heating in a solvent of kerosene. No. 2,390,911. Thomas Allen and Herbert Harris to Wisconsin Alumni Research Foundation.

Killing weeds which consists in applying substance selected from halogenated phenoxy monocarboxylic acids, their salts and esters. No. 2,390,941. Franklin Jones to American Chemical Paint Co.

Lubricant comprising hydrocarbon lubricating oil and to stabilize oil against heat and oxidation, a metal salt of a phenol and oxidation inhibitor containing benzene nucleus to which are attached two substituents selected from amino radicals and oxy radicals. No. 2,390,943. Frank Kavanagh, Bruce Farrington and James Clayton to California Research Corp.

Preparing lithographic plate, which comprises removing deep-etching solution from plate after it has been etched, drying plate, and then effecting final removal of water by applying film forming lacquer containing anhydrous organic solvent which forms negative azeotropic mixture with water. No. 2,390,944. Charles King to The Lithographic Technical Foundation, Inc.

Oil solubilizing composition, comprising mineral oil soluble sulfonate extracted from petroleum oil, a mono-unsaturated fatty acid, a sodium-alkyl-naphthalene-sulfonate, and monohydric alcohol. No. 2,391,087. Theodore Donlan and Albert Gathman to Standard Oil Development Co.

Lubricant comprising mineral oil base stock, salt of a polybasic inorganic acid which contains oil-solubilizing substituent organic group, said salt having tendency to cause corrosion of metal surfaces and alkylation product obtained by reacting p-cresol with isobutene in presence of sulfuric acid. No. 2,391,099. John McNab and Carroll Wilson and Carl Winning to Standard Oil Development Co.

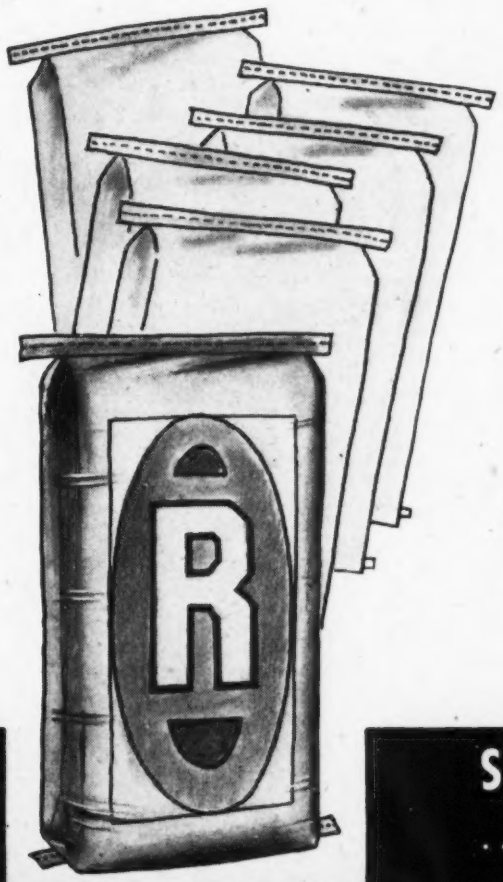
Water-resistant, high temperature, extreme pressure-lubricant of grease type, consisting of asphaltic base lubricating oil, lithium soap of hydrogenated fish oil acids, lead oleate, zinc naphthenate, aluminum stearate and chlorinated wax. No. 2,391,113. John Zimmer and Arnold Morway to Standard Oil Development Co.

Producing granular absorbent from bauxite fines, which comprises admixing fines with aqueous solution containing sodium silicate, etc. No. 2,391,116. Kenneth Ashley to American Cyanamid Co.

Lubricant which comprises oil base and to inhibit deterioration of oil, a compound of formula described in patent. No. 2,391,184. Joseph Nelson and Louis Mikeska to Standard Oil Development Co.

Forming aque-organosol composed of colloidal silica, water and organic solvents. No. 2,391,253. Morris Marshall to Monsanto Chemical Co.

Lubricating composition non-corrosive to bearing materials of composite metal type including cadmium-nickel bearing materials and having high film-rupture strength, which composition comprises, lubricating oil base having incorporated tin oleate, phosphate selected from tricresyl, triphenyl and trinaphthyl phosphate and phosphite selected from tributyl



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From Official Gazette—Vol. 581, No. 4—Vol. 582, Nos. 1, 2, 3 (Dec. 25-Jan. 15)—p. 660

and triamyl phosphite. No. 2,391,311. William Helmore to C. C. Wakefield & Co., Ltd.

Impregnating composition comprising water-soluble phenol-aldehyde resin and aqueous emulsion of residue low in abietic acid remaining after separation of refined rosin obtained by extraction of pine wood with solvent. No. 2,391,368. George Underwood to Hercules Powder Co.

Machinable insulating composition comprising finely divided crystalline substance having high dielectric constant taken from titanium dioxide and titanates and mixtures, mixed with finely divided mica, being bonded by glass frit. No. 2,391,376. Albert Monack to Mycalex Corp.

* Textiles

Aqueous bath for wet treatment of organic fibrous materials comprising amine selected from group consisting of N-(2-aminiosobutyl)-1-methyl-heptylamine, N-(2-aminoisobutyl)—hendecylamine, etc. No. 2,389,875. Murray Senkus to Commercial Solvents Corp.

Increasing luster and water-receptivity of cellulosic yarns and fabrics which comprises treating material with acrylonitrile and aqueous solution of strong hydroxide. No. 2,390,032. James Stallings to Rohm & Haas Co.

Reducing porosity of cellulosic fabric-hose which comprises treating hose with acrylonitrile and solution of strong hydroxide. No. 2,390,033. James Stallings to Rohm & Haas Co.

Rendering fibrous textile material fast to slipping which comprises impregnating material with solution containing compound of formula shown in patent. No. 2,390,046. Otto Albrecht to Society of Chemical Industry in Basle.

Obtaining improved dry-spun hydrolyzed ethylene/vinyl acetate interpolymer filament, which comprises spinning solution of completely hydrolyzed interpolymer of ethylene with vinyl acetate. No. 2,390,132. Albert Smith and Halsey Stevenson to E. I. du Pont de Nemours & Co.

Imparting improved wash resistance to textile material, which comprises applying alkaline solution of alkali-soluble and acid-insoluble cellulose ether, applying acid to insolubilize cellulose ether, and thereafter applying aqueous dispersion of quaternary ammonium salt. No. 2,390,235. Kenneth Barnard and Boris Frankfurt to Pacific Mills.

Textile fabric impregnated with isinglass and iodine, isinglass preventing chemical reaction between fabric and iodine. No. 2,390,391. Charles Ritter.

Device for treating filamentary material. No. 2,390,572. Camiel de Brabander to American Viscose Corp.

Forming flexible, waterproof fabric, comprising coating porous fabric with aqueous alkaline solution of a hydrophilic alkali-soluble cellulose ether insoluble in water, etc. No. 2,390,780. Ralph Cornwell to Sylvania Industrial Corp.

Producing yarns, stable on storage, but may be disintegrated by heating, which comprises treating yarn selected from vegetable fibers, artificial fibers of vegetable origin and silk with solution of sulfuric acid salt of an organic base to impregnate yarn therewith and drying. No. 2,390,903. William von Glahn and William Walsh to General Aniline & Film Corp.

Composition for matting or delustering artificial silk comprising pigment and water-insoluble free biguanide base containing alkyl chain. No. 2,390,975. Jesse Werner to General Aniline & Film Corp.

Apparatus for subjecting fabrics to a fire test. No. 2,391,161. Ernest Hubert to I. F. Laucks, Inc.

Agricultural

Producing non-break vegetable oil. No. 2,392,390. Percy Julian and Herbert Iveson to The Glidden Co.

Extracting hard wax from sugar cane muds which comprises heating mud with solvent of class of lower alkyl acetates and lower alkyl propionates, etc. No. 2,391,893. Werner Goepfert to Interchemical Corp.

Dry pectin containing at least 1.5% Al_2O_3 and not completely dispersible in water and containing alkali metal salt of a hydroxy substituted organic acid to render pectin completely dispersible in water. No. 2,392,854. Herbert Leo and Clarence Taylor to Mutual Citrus Products Co., Inc.

Refining raw sugar which comprises treating syrup of raw sugar with hypochlorite bleaching agent of nonprecipitable kind whereby ash-forming ions are introduced in syrup, and subjecting syrup to cation exchanger material operating in hydrogen cycle and then to anion exchanger material operating in hydroxyl cycle whereby ash-forming ions are removed. No. 2,391,649. Ralph Shafor to The Dorr Co.

Removal of impurities from cane sugar juice. No. 2,391,843. Franklin Rawlings to The Dorr Co.

Biochemical

Preparing vitamin-hormone type plant stimulant for application to plants in minute dosages, which comprises treating fine solid particles with rancidifiable fatty ester oil to make sticky dust and block all openings in said particles capable of entrapping and retaining and making inactive any proportion of stimulant to be intermixed. No. 2,392,518. George Barnhill, one-half to Herbert Moses.

Treating distillery slop from mashing of cereals and fermentation and distillation of mash so obtained. No. 2,391,918. Ellis Pattee to National Distillers Products Corp.

Concentrates of albumen-chlosterol complexes which are soluble in water in presence of neutral electrolytes and are readily split up into their components by strong acids and alkalies as well as organic solvents capable of denaturing proteins. No. 2,392,058. Manfred Oberdorffer, Adolf Butenandt, Joseph Schmidt-Thome, and Hans Maier-Huser to Schering Corp.

Producing gum dextran comprising fermenting to viscous mass a polysaccharide substrate in presence of species Leuconostoc mesenteroides (Cienkowski) Van Tieghem and nutrient medium therefor containing autolyzed yeast, blood and tankage. No. 2,392,258. William Owen, Jr., and William L. Owen.

Treating gelatin to prevent agglomeration of discrete particles of gelatin when in contact with aqueous medium, comprising adding volatile refrigerant to gelatin. No. 2,392,297. Maurice Strenitz to Industrial Patents Corp.

Recovering neutral oil from crude fatty oils containing gums including phosphatidic material, which includes mixing oil with non-saponifying neutralizing agent and separating resulting soap stock in presence of substantial amounts of water. No. 2,392,973. Benjamin Clayton to Refining, Unincorp.

Producing dextrose, which comprises adding sulphuric acid to a starch suspension; hydrolyzing this mix, etc. No. 2,393,095. Walter Fetzer to Union Starch & Refining Co.

Preparation of phosphatide composition. No. 2,391,462. Percy Julian and Edwin Meyer to American Lecithin Co.

Treating sterols to form and isolate chromium oxychloride sterols, which comprises reacting sterols with chromium oxychloride in presence of a non-polar solvent. No. 2,391,743. Jacob Rosin.

Ceramics

Glass of high electrical resistivity and chemical durability which consists of SiO_2, B_2O_3, Al_2O_3, Na_2O, K_2O, and Li_2O and BaO. No. 2,392,314. Robert Dalton to Corning Glass Co.

Forming strong dense body from mixture of finely-divided silica and glass. No. 2,392,568. George Bair to Norbert Garbisch.

Producing bent laminated safety glass comprising coating one surface of glass sheets with water-soluble salt that remains water soluble, solid and inert to glass at temperatures employed, etc. No. 2,392,770. Joseph Ryan and George Zolman to Libbey-Owens-Ford Glass Co.

Embedded-resistor electric heating element comprising embedding having high heat conductivity and low electrical leakage and for operation at red heat, consisting of material compacted under pressure, comprising granular refractory material of high heat conductivity and low electrical leakage, and comprising also talc. No. 2,391,995. Joseph McOrily to Edwin Wiegand Co.

Fibrous strand composed of multiplicity of glass fibers, fibers whereof are coated with material containing dodecyltrichlorosilicane to lubricate and protect fiber surfaces against mutual abrasion, and resin to bind them into integral body, said resin containing organo-silicon compound. No. 2,392,805. Lawrence Biefeld to Owens-Corning Fiberglas Corp.

Cellulose

Method and apparatus for production of alkali cellulose. No. 2,392,269. William Schmitz, Jr., to E. I. du Pont de Nemours & Co.

Activating cellulose to prepare it for esterification, which comprises treating cellulose with mixture of fatty acid of 3-4 carbon atoms, formic acid, and sulfuric acid. No. 2,391,569. Clifford Haney and Mervin Martin to Celanese Corp. of America.

Coatings

Wrinkle composition consisting of heat reaction product of oil soluble resin selected from run natural resins requiring running for production of oil solubility, rosin-modified alkyd resins, and phenolaldehyde resins which do not evolve formaldehyde and water on cooking with drying oil, unblown drying oil, and polycarboxylic acid in admixture with drier and thinner. No. 2,392,346. William Waldie to New Wrinkle, Inc.

Coating composition comprising solution in organic solvent of resinous polymerization product obtained by polymerizing cyclopentadiene in a glyceride of fatty acid. No. 2,392,732. Howard Gerhart to Pittsburgh Plate Glass Co.

Temporary coating on glass article produced by applying composition comprising: isobutylated urea, formaldehyde resin, isobutyl alcohol, toluene, hydrogenated naphtha, (Troluoil" or "Solvesso No. 2," 75 per cent phosphoric acid catalyst to said glass. No. 2,392,768. Joseph Ryan to to Libbey-Owens-Ford Glass Co.

Metal article with laminated protective coating having fibrous layer affixed to metal article by interposed adhesive layer, and outer bituminous layer having incorporated metallic soap insoluble in water, selected from soaps of iron, zinc, aluminum, and barium. No. 2,392,272. Purdum Snyder to H. H. Robertson Co.

Making coated film which comprises placing rubber hydrochloride film under tension without stretching same, and applying to film a solution in a rubber hydrochloride solvent of a benzene-soluble copolymer formed from vinyl chloride and vinylidene chloride, and allowing solvent to dissolve surface of rubber hydrochloride film. No. 2,393,006. Joseph Vincent to Wingfoot Corp.

Treating a metal manifold coated with enamel whose formula is given in patent. No. 2,391,468. Robert Long to American Porcelain Enamel Co.

Nonreflective lens coating. No. 2,391,595. Dorothy Richards and William Miller to Vard Inc.

Dyestuffs

Water-soluble acetate rayon dyestuff consisting of alkali metal salt of aminoanthraquinone containing one anthraquinone nucleus bearing, as substituents directly attached to nucleus a hydroxyl group, two amio groups, and grouping of formula -NH-CO-X-COOH. No. 2,392,663. Paul Grossmann to Society of Chemical Industry in Basle.

Vat dyestuff of anthraquinone series. No. 2,392,794. Werner Zerweck and Ernest Honold to General Aniline & Film Corp.

Dyestuff dispersible in water immiscible organic solvents comprising reaction product of dyestuff having sulfonic acid groups with ester of condensation product of ethylene oxide and triethanolamine. No. 2,392,158. Harold Lacey and Walter Ness to American Cyanamid Co.

Azo dyestuffs. No. 2,392,167. Robert Long to American Cyanamid Co.

Azo derivatives of amino diphenylamines. No. 2,392,180. Robert Parker and John Denten to American Cyanamid Co.

Diphenylamine azo dyestuffs. No. 2,392,181. Robert Parker and Corris Hofmann to American Cyanamid Co.

Manufacture of trisazo dyestuffs in which interior monazo component consisting of tetrazotized benzidine mono-coupled in acid medium with amino-naphthol-disulfonate is thereafter coupled in alkaline medium with diazo of an arylamine and with azo dye coupling component of group consisting of arylamines and hydroxy aryl compounds. No. 22,705. William Williams to E. I. du Pont de Nemours & Co.

Color composition comprising vat dye and salt of a monoquinonyl amide of a dicarboxylic acid. No. 2,391,836. Roy Kienle and Chester Amik to American Cyanamid Co.

Equipment

Gaseous electric discharge lamp comprising vitreous envelope previous to ultra-violet radiations, electrodes therein for initiating and sustaining discharge upon application of potential thereto, ironizable medium in envelope including arsenic. No. 2,392,305. Norman Beese to Westinghouse Electric Corp.

* Continued from Vol. 580, No. 4, Vol. 581, No. 1, 2, 3

From Official Gazette—Vol. 581, No. 4—Vol. 582, Nos. 1, 2, 3 (Dec. 25-Jan. 15)—p. 661

Viscous liquid feeding apparatus for double drum drier having pair of parallel heated drums which have opposing sides in closely spaced relation to one another and forming valley therebetween containing pool of viscous liquid. No. 2,392,382. Guy Harcourt and Duncan Montgomery to Blaw-Knox Co.

Apparatus for direct numerical evaluation of hardness from observation of impression made on metals under definite load by means of penetrometer. No. 2,392,461. John Clifton and Frederick Rabarts to Vickers-Armstrong Ltd.

Apparatus for carrying out chemical reaction involving plurality of fluids and for mixing fluids during reaction comprising stationary enclosing means forming a closed large mixing and reaction zone and comprising container and cover therefor, etc. No. 2,392,542. Maryan Matuszak to Phillips Petroleum Co.

Viscosimeter comprising coaxial inner and outer members in predetermined fixed relation to each other leaving continuous annular space between said members, etc. No. 2,392,662. Rudolph Griesheimer to K-C-M Company.

Apparatus for filtering liquid material, comprising outer container for holding liquid to be filtered, a cylindrical screen, disposed within outer container and spaced therefrom so that all of exterior peripheral surface of screen is exposed to direct contact with liquid. No. 2,392,666. Benjamin Harris.

Scrubbing tower or column. No. 2,392,705. Carlos Smith and Harry Bullock.

Gas producing apparatus comprising internal combustion engine, a multistage compressor driven thereby, connections from exhaust of engine to intake of first stage of compressor, etc. No. 2,392,711. Walter Willenborg to Inert Gas Equipment, Inc.

Agitator to be removably inserted within container for paint or like comprising flat main body member adapted for rotation about vertical axis lying in plane of said member and located centrally between its opposite side edges, etc. No. 2,392,731. Mitchell Fox.

Apparatus for mixing and blending fluid materials having tank for receiving material and for subjecting material to circulatory mixing displacement, etc. No. 2,391,858. George Auer.

Apparatus for treating dust-laden gases comprising primary dust separator having air inlet, air outlet, and dust outlet, a supplemental air passage having a venturi, etc. No. 2,391,863. William Bowen.

Jacketed tank or container comprising nested inner and outer shells having their walls spaced apart, partition means extending between walls. No. 2,391,876. Carl Brown to Glascote Products, Inc.

Apparatus for imparting glossy finish to surface of soap cakes or bars. No. 2,391,919. Thomas Penny to Lever Brothers Co.

Apparatus for effecting destruction of insect life in a flowable product composed of individual solid parts, the combination of, a casing-like structure having inlet passageway for product and having outlet passageway therefor, rotary treating means within structure, etc. No. 2,391,929. Franklin Smith.

De-liquefying apparatus, comprising: chamber means having overflow outlet at upper level and having downwardly tapering lower portion, etc. No. 2,392,020. Edwin Wiegand to Orefraction Inc.

Manufacture of electrical apparatus consisting of glass sealed magnetic and electrical elements, step of heat treating such apparatus in atmosphere of purified hydrogen. No. 2,392,099. Charles Pollard, Jr. to Bell Telephone Laboratories, Inc.

Molecular centrifugal process and apparatus. No. 2,392,124. Orban Denys to Distillation Products, Inc.

Wire supporting device, comprising a balloon, a container including annular gas generator formed by inner and outer walls to provide therebetween space for chemical gas-generating material and providing central storage space within inner wall for balloon, etc. No. 2,392,199. Leonard Steiger to Maywood Chemical Works.

Apparatus for concentrating liquid, such as sulphuric acid, comprising a still, preliminary concentrating chamber arranged at higher level than still, etc. No. 2,392,219. Leon Bailly to The International Furnace Equipment Co. Ltd.

In electron microscope, the method of controlling specimen electron penetrability while maintaining constant the electron velocities at image. No. 2,392,243. James Hillier to Radio Corp. of America.

Nitriding container comprising body and closure together with gas connections, all interior parts of said body and closure presenting continuous aluminum surfaces inert to nascent hydrogen and nitrogen in nitriding process. No. 2,392,267. Nicholas Salkover to The Queen City Steel Treating Co.

Field reservoir for liquids, comprising earth-encompassed and supported cup-like sheet of liquid-impervious material having closed bottom and side walls supported at outer faces against exposed surface of open hole in earth. No. 2,392,288. Grosvenor Marcy to Boston Woven Hose & Rubber Co.

Mechanism for controlling flow of fluid or gas. No. 2,392,806. James Buchnam and Edward Meincke and Lloyd Young to The Linde Air Products Co.

Gas cleaner apparatus comprising separator housing having closed top and removable bottom closure, gas inflow conduit communicating with said housing, etc. No. 2,392,872. George Wolfe to Dorothy McKenzie.

Furnace for treatment of finely divided material such as carbon black comprising horizontally disposed furnace shell having receiving and discharging ends, etc. No. 2,393,106. Bernard Johnson and Henry Foster to Columbian Carbon Co.

Knife mount for high temperature precoat filters. No. 2,393,150. Herbert Dayton to Standard Oil Development Co.

Apparatus for subdividing mass of highly viscous, pseudo-solid liquid which apparatus comprises platform and vertical posts thereon to support mass to be subdivided against displacement during subdivision, etc. No. 2,393, 185. Robert Pollard to Western Electric Co. Inc.

Gas flow control apparatus comprising means to contain pool of mercury, means to adjust level of pool up and down, upright tube having lower end extending down into containing means below normal level of mercury and having both ends open, etc. No. 2,393,201. Alfred Stafford to Western Electric Co. Inc.

Portable apparatus for selective testing of combustible gases with different ignition temperatures. No. 2,393,220. Moses Jacobson and Ralph Hartline to Mine Safety Appliances Co.

Container for portable gas analysis equipment consisting of base having pair of narrow uprights cut out at top, said uprights having grooves for receiving sliding panels, manifold support for connecting pipettes, etc. No. 2,391,390. George Carlson to Burrell Technical Supply Co.

Refractometer comprising rigid housing, a series of spaced scales of consecutive values mounted in limited field in housing, etc. No. 2,391,599. Martin Silge.

Apparatus for pelleting of material normally susceptible to spontaneous combustion or otherwise readily combinable with oxygen. No. 2,391,638. Edgar Meakin.

Chemical pump, which comprises a housing, spaced apart diaphragms partitioning housing into forcing chamber, constant pressure chamber and pumping chamber, etc. No. 2,391,703. Walter Hughes to Infilco Inc.

In liquid treating apparatus wherein liquid to be treated is mixed with circulating slurry comprising suspended particles separated and accumulated from previously treated liquid, a tank, a partition structure in said tank forming therein central mixing and reaction, chamber, etc. No. 2,391,738. Frank Prager to Infilco Inc.

Preparing water-resistant containers. No. 2,391,791. Irving McHenry to Mid-States Gummed paper Co.

Liquid level indicating mechanism for use with containers subject to bodily displacement angularly comprising a different manometer, etc. No. 2,391,852. Lewis Winton to Jerguson Gage & Valve Co.

Food

Making milk powder from whole milk. No. 2,392,401. Gerald North and Alvin Alton to Beatrice Creamery Co.

Decaffeinating coffee and recovering caffein which comprises dissolving caffein from coffee in chlorinated organic solvent of low polarity, adsorbing caffein on clay, desorbing caffein from clay by a non-chlorinated organic solvent of high polarity, and recovering caffein from second solvent. No. 2,391,981. Roland Kremers to General Foods Corp.

Concentrating apple juice to produce concentrate with solids content of over seventy-five percent which comprises rotating a coil partially submerged therein on horizontal axis. No. 2,392,093. Ray Laird.

Treating tomato juice. No. 2,392,197. Horace Smith, Jr., Weld Conley, Jr. and Wilfrid Atwood to Chain Belt Co.

Preparing dried tomato products which comprises quick drying and finely dividing tomato juice dispersed with finely divided gelatinized edible carbohydrate. No. 2,392,241. Elmer Glabe to Stein, Hall & Co. Inc.

Dry, comminuted, siftable, readily water dispersable shortening composed of finely divided discrete particles of edible fat, each of particles being provided with coating including milk solids and added edible, water absorptive, hydrophilic agent. No. 2,392,833. Edward Chapin to Beatrice Creamery Co.

Making dry, comminuted, siftable, non-greasy, free-flowing readily water dispersible shortening composition composed of finely divided discrete particles of edible fat, each particle being provided with coating including milk solids and edible water wettable, water absorptive hydrophilic agent. No. 2,392,994. Gerald North, Alvin Alton and Lawrence Little to Beatrice Creamery Co.

Dry powdered shortening composition comprising minute particles of edible shortening encased in envelopes of natural buttermilk solids, including milk fat, protein and phospholipoids. No. 2,392,995. Gerald North, Alvin Alton, and Lawrence Little to Beatrice Creamery Co.

Food composition comprising heated aqueous dispersion of combination of finely divided special fraction of dehulled oats and gelatin. No. 2,391,474. Sidney Musher to Musher Foundation Inc.

Making palatable and potable water solution of foaming agent for beverages which comprises dissolving milk whey when protein in aqueous solution of sodium hydroxide and sodium chloride, etc. No. 2,391,559. June Faulker.

Improving nutritional qualities of food products and vitamin preparations, which contain folic acid, which comprises treating materials with xanthopterin-substance to enhance available folic acids content. No. 2,391,850. Arnold Welch and Lemuel Wright to Sharp & Dohme, Inc.

Inorganic

Producing water-soluble basic aluminum chlorides which comprises electrolyzing aqueous solution of aluminum chloride free from alakli metal salts in diaphragm cell and withdrawing liquid formed in cathode chamber before solid substances precipitate. No. 2,392,531. Werner Huehn and Walfried Haufe.

Production of hydride of alkali earth metal which comprises reacting phenolate of metal with hydrogen to produce hydride. No. 2,392,545. Maurice Pechet to Hardy Metallurgical Co.

Making zirconium oxide for use as opacifier from zirconium-carbon-oxygen intermediates. No. 2,392,605. John Miller to The Titanium Alloy Manufacturing Co.

Effecting removal of compounds of heavy metals and magnesium from sodium sulphate containing hexavalent chromium compounds. No. 2,392,669. Alfred Hirsch to Diamond Alkali Co.

Silicic acid product and processes for producing same. No. 2,392,767. John Robinson, Jr. to E. I. du Pont de Nemours & Co.

Electrochemical process for production of sodium perchlorate. No. 2,392,769. Joseph Ryan to Buffalo Electro-Chemical Co. Inc.

Producing basic aluminum chloride composition for use as body deodorant which comprises adding molecular equivalent of chloride free aluminum hydroxide gel to solution of normal aluminum chloride, etc. No. 2,392,153. Ernest Kastning to William R. Warner & Co. Inc.

Production of lead thiocyanate. No. 2,392,191. Thomas Robbins, Jr. to Koppers Co. Inc.

Manufacture of alkali hydroxides and apparatus for carrying out reactions. No. 2,392,236. George Edwards to Imperial Chemical Industries Ltd.

Phosphor consisting of strontium aluminate matrix activated with manganese, characterized by red fluorescence under long-wave ultraviolet excitation, and by orange fluorescence under cathode rays. No. 2,392,814. Herman Froelich to General Electric Co.

Making perchloric acid which comprises reacting hydrochloric acid with perchlorate of sodium or barium, etc. No. 2,392,861. John Pernert to Oldbury Electro-Chemical Co.

Electrolytic alkali chlorine cell. No. 2,392,868. Kenneth Stuart to Hooker Electrochemical Co.

Treating solutions of sodium carbonate and sodium sulphate that said solutions are included in field of burkeite stability, to increase ratio of sodium carbonate to sodium sulphate therein. No. 2,392,888. Henry Suhr and Elliott Fitch to American Potash & Chemical Corp.

Preparing briquets of calcined dolomite and ferrosilicon. No. 2,393,080. Robert Waring to The New Jersey Zinc Co.

Producing finely divided free flowing anhydrous particles of caustic alkali without corrosion of equipment and free from contamination of mother liquor. No. 2,393,108. Vaman Kokatnur to Autoxygen, Inc.

Production of aqueous magnesium chloride liquors by carbonating slurries of mixed hydrates of magnesium and calcium in aqueous calcium chloride

liquors containing soluble sulphates. No. 2,393,115. Robert MacMullin to The Mathieson Alkali Works, Inc.

Making aluminous product which is uniformly hard, dense, vitreous, and non-porous which comprises partially dehydrating aluminum hydroxide, dry grinding hydroxide to average particle size of less than 50 microns, blending particles with catalysts, forming and firing. No. 2,391,454. John Heany to Heavy Industrial Ceramic Corp.

Apparatus for treating ammonium sulphate crystals. No. 2,391,484. William Seymour to Koppers Co. Inc.

Abrasive or cutting tool formed of diamond particles bonded together by a bond which functions as secondary abrasive and consists of a mixture of boron carbide, silicon carbide and metallic carbide. No. 2,391,589. Leon Nussbaum, one-half to Hatim Attari.

Forming blocking layers on selenium coated plates which comprises treating selenium surface cathodically in electrolyte composed of nitrobenzene and containing chromium trioxide. No. 2,391,706. Lloyd Jackson and Wendell Stewart to Battelle Memorial Institute.

Making powdered iron oxide, comprising: treating particles of iron with high pressure steam to cause oxide coating to be formed at surface, mechanically removing oxide coating, etc. No. 2,391,723. Cecil Mann to General Motors Corp.

Production of alkali metals. No. 2,391,728. Thomas McConica, III, Arthur MacPhail, and Roy Kirk to The Dow Chemical Co.

Making molds for reproduction of patterns by casting, which comprises making fluid mix of gypsum plaster composition, water, potassium hydroxide, meta phosphoric acid, finely divided sulfur, etc. No. 2,391,855. Xarifa Bean.

Medicinal

Hormone derivative, quinidine oestradiol 3 monosulphate. No. 2,392,660. Gordon Grant and Carl von Seemann.

Stabilizing dispersion of prolamine in liquid organic dispersing against gelation when stored, consisting of heating dispersion under such conditions of pressure and time that evaporation of dispersing medium is not substantial and dispersion is stabilized without setting prolamine as a gel. No. 2,392,084. Cyril Evans and Ralph Manley to the Secretary of Agriculture of the United States of America.

Purifying sulphathiazole which comprises forming aqueous solution of salt of sulphathiazole with volatile base, decolorizing removing base by heat and removing precipitater sulphathiazole. No. 2,392,125. Leonard Dhein to American Cyanamid Co.

Producing N⁴-acetylsulfanilamido compounds. No. 2,392,156. Victor King to American Cyanamid Co.

Synthetic oestrogens. No. 2,392,852. Morris Kharasch to Eli Lilly and Co.

Oily diethyl-(p-cyclohexenonyl)-(p-cyclohexanolyl)-ethane having androgenic activity of about 1 capon unit for each mg. No. 2,392,864. Walter Schoeller, Hans Inhoffen, Konrad Steinruck and Otto Hoss to Schering Corp.

Antipressor composition, serving to lower blood pressure in cases of hypertension and pregnancy, comprising compound of benzoic acid with urobilinogen. No. 2,392,878. Harold Rabinowitz.

Preparation of vitamins of the type B_1. No. 2,393,109. Rezso Konig and Zoltan Foldi.

Crystalline dl-alpha-tocopherol-p-nitro-benzoic caid ester. No. 2,393,134. John Aeschilmann to Hoffmann-La Roche, Inc.

Vaccine containing attenuated virus of canine encephalitis and capable of immunizing dogs against disease without inducing disease. No. 2,391,540. Charles Beckman.

Preparation containing anaesthetic salt, oxidizable vaso-constrictor, and, as anti-oxidant, addition product of aromatic aldehyde with salt selected from bisulphite salts, hydrosulphite salts and metalbisulphite salts. No. 2,391,552. David Curtis.

Germicidal compositions containing mixture of alkyl phenols having alkyl phenol with five to seven carbon atoms in alkyl group. No. 2,391,798. Roland Read to Sharp & Dohme, Inc.

Synthesis of wound hormone, a 1-carboxy lo-carbaloxy-decene-1. No. 2,391,824. James English, Jr., James Bonner and Arie Haagen-Smit to California Institute Research Foundation.

Producing N⁴-succinylsulphathiazole which comprises reaction of succinic anhydride with sulphathiazole in presence of acetone as solvent. No. 2,391,853. Ferdinand Zienty to Monsanto Chemical Co.

Metals, Ores

Thermally working mineral and like masses comprising separating and removing material from such mass by applying oxy-fuel flame while introducing into such flame a comminuted flux-forming fuel. No. 2,392,353. Robert Aitchison to The Linde Air Products Co.

Purifying neutral manganese electrolyte solutions containing manganese and ammonium sulphates. No. 2,392,385. John Hunter.

Coating ferrous surface comprising electrodepositing copper coating on said surface, thereafter electrodepositing a zinc coating on copper deposit, etc. No. 2,392,456. Henry Brown and Carl Hurley to The Udylite Corp.

Making castings of cobalt-chromium tungsten alloys. No. 2,392,510. Shelley Stoody and Ralph Abos to Stoody Co.

Machine for extracting lead fo:m its ore, a trough having side walls and a bottom, side walls being lined inward with fire-proof material, etc. No. 2,392,526. Orville De Shazo, fifty per cent to Nora De Shazo.

Producing metallic cathode which may be broken easily into plurality of pieces of predetermined size. No. 2,392,614. Harry Prescott to Anaconda Copper Mining Co.

Workable alloys having 0.2 to 7.5% copper, 0.1 to 0.7% arsenic, balance being zinc. No. 2,392,641. Edward Bunn to Revere Copper and Brass Inc.

Hot and cold workable zinc base alloys, characterized by toughness and tensile strength and free from intercrystalline corrosion, containing 0.3 to 0.9% copper and 0.2 to 0.6% silicon, the balance being zinc. No. 2,392,642. Edward Bunn to Revere Copper and Brass Inc.

Zinc base alloys containing copper, silicon and phosphorus. No. 2,392,643. Edward Bunn to Revere Copper and Brass Inc.

Electrodeposition of metallic tin comprising conducting electrolizing current from a tin anode to article to be coated as a cathode through aqueous solution comprising sodium stannate and sodium hydroxide. No. 2,392,646. William Cooper and Charles Glock to Crown Cork & Seal Co. Inc.

Apparatus for continuously electroplating wire and like including rotatable tubular electrode, etc. No. 2,392,687. John Nachtman.

Producing nickel anodes containing sulphur which comprises immersing anode and a starting sheet as cathode in aqueous electrolyte comprising nickel ions, sulphate ions, chloride ions, borate ions and alkali metal thiosulphate. No. 2,392,708. Harry Tschop to The International Nickel Co. Inc.

Producing metallic powder in spherical grain form which comprises electrolyzing, using anode comprising metal to be powdered, a salt melt electrolyte comprising less noble metal anion and cation capable of forming volatile salt with metal to be powdered. No. 2,391,903. Erik Johansson.

Electrostatic separation of material particles. No. 2,392,044. Basil Horsfield to Orefraction Inc.

Electrodeposition of zinc. No. 2,392,075. Richard Wick to Bethlehem Steel Co.

Metal-working tool having wearing surface composed of nickel-base alloy containing molybdenum, chromium, remainder principally nickel. No. 2,392,821. Malcolm Kreag to Haynes Sellite Co.

Electrodeposition of hard, dense, malleable chromium having high resistance to impact, step of electrolyzing electrolyte containing chromic acid and containing sulphate radical. No. 2,392,871. Richard Wick.

Manufacturing concave cold type electrodes having metallic coating on their inner surfaces which comprises coating one side of elongated metal strip with suspension of powdered anti-glow metallic material in volatilizable binder, etc. No. 2,392,879. Thomas Radcliffe to General Electric Co.

Securing fine mesh, metallic screen within copper brazed assembly while preventing copper from reaching material of screen, which includes binding edges of screen material with chromium plated strip of ferrous material, etc. No. 2,392,886. Henry Stecher and Joseph Paquin to The Weatherhead Co.

In welding silver to steel, improvement which comprises forming thin coating of copper on surface of steel by flowing molten copper thereon, etc. No. 2,392,917. Edward Guinee to The H. A. Wilson Co.

Spark plug having electrode made of rhodium-free alloy containing palladium, other elements, balance being platinum. No. 2,392,944. Leonard Pfeil to The International Nickel Co. Inc.

Froth flotation of magnesite from siliceous impurities contained in ore, improved method which comprises incorporating in pulp of ore a collector reagent comprising mixed aliphatic acids obtained from petroleum. No. 2,393,008. Herbert Woodward and William Bates to Defense Plant Corp.

Press for compacting powdered metals, a compacting chamber, a feed chamber in alignment therewith, etc. No. 2,393,130. Harry Toulmin, Jr. to H-P-M Development Corp.

Separating fragmentary mixtures of minerals of different specific gravities, which comprises subjecting mixture to a dium comprising suspension of finely divided iron carbon alloy in water, having associated therewith a chromate. No. 2,393,160. Oscar Harder and Arnold Pavlish to Pittsburgh Crushed Steel Co.

Producing from ingot or billet of aluminum base alloy containing 3 to 10 percent of tin, a hot rolled slab which will not liquate excessively when annealed at 600° to 850° F. No. 2,391,401. Charles Fiscus to Aluminum Co. of America.

Spark plug for aviation engines comprising pair of spaced electrodes, one being formed of platinum and other of tungsten. No. 2,391,455. Franz Hesel to P. R. Mallory & Co. Inc.

Spark plug comprising electrode including core and sheath, said sheath comprising material selected from platinum and platinum base alloys, and core consisting of material from molybdenum, molybdenum base sintered metal compositions, tungsten, etc. No. 2,391,456. Franz Hensel to P. R. Mallory & Co. Inc.

Spark gap electrode containing rhenium. No. 2,391,458. Franz Hensel to P. R. Mallory & Co. Inc.

Purification of used Woods' metal and similar low melting point alloys, a settling tank to hold impure molten alloy, etc. No. 2,391,516. Alvin Richards and James O'Reilly to Ford Motor Co.

Testing surface of aluminum and aluminum alloy articles to discover cracks and similar physical defects therein which comprises forming in defects an aluminum compound which is effective to fix an organic dye. No. 2,391,522. Charles Slunder to Aluminum Co. of America.

Preparation of finely-divided charge for sintering, which comprises compressing charge to form coherent flakes with water, moistening flakes, and pelleting by rolling them on a surface. No. 2,391,588. John Naratil to The New Jersey Zinc Co.

Lubricant for cold rolling of steel comprising mineral oil, sulfonated castor oil, tricresyl phosphate, and lorol phosphate. No. 2,391,631. Richard Kingerley, Jr. to E. I. du Pont de Nemours & Co.

Preparing lubricant for metal beating, comprising dissolving sodium palmitate in alcohol, mixing dehydrated calcium therein, etc. No. 2,391,653. Donald Swift to M. Swift & Sons, Inc.

Preparing lubricant for metal beating, comprising dissolving sodium stearate in alcohol, mixing dehydrated calcium sulphate, etc. No. 2,391,654. Donald Swift to M. Swift & Sons, Inc.

Ferrous sheet for forming containers, said sheet coated with fine-grained continuous phosphate coating. No. 2,391,656. Robert Tanner to Parker Rust-Proof Co.

Recovery of magnesium from vapor mixtures. No. 2,391,713. Roy Kirk, Charles Nelson, and Thomas McConica, III, to Dow Chem. Co.

Producing magnesium, which comprises heating mixture of magnesium oxide source material and a carbonaceous reducing agent, etc. No. 2,391,727. Thomas McConica, III, to The Dow Chemical Co.

Treating aluminum or aluminum alloy scrap. No. 2,391,752. Max Stern.

Protecting article of magnesium from ignition by fire which comprises applying over surface of article a film-forming organic liquid coating composition having incorporated comminuted metal fluoride. No. 2,391,844. James Reid to The Dow Chemical Co.

Organic

Producing acrylic nitrile by dehydration of ethylene cyanhydrin. No. 2,392,303. Frederick Balcar to Air Reduction Co. Inc.

Production of oxygenated organic compounds, which comprises mixing gaseous unsaturated aliphatic hydrocarbon with air and adding anhydrous unreacted gaseous unsaturated aliphatic hydrocarbon recycle, etc. No. 2,392,316. Camille Dreyfus.

Substituted dihydroimidazoles. No. 2,392,326. Lucas Kyrides to Monsanto Chemical Co.

Production of toluol from naphthenic straight run gasolines via catalytic dehydrogenation, method of producing increased yields of pure toluol while realizing maximum catalytic efficiency. No. 2,392,230. George Liedholm and Frank McMillan to Shell Development Co.

Additional patents on all other classifications from the above volumes will be given next month.

Abstracts of Canadian Patents

Collected from Original Sources and Edited

Requests for further information or photostated copies of the patents reported below should be addressed to the Commissioner of Patents and Copyrights, Department Secretary of State, Ottawa, Canada.

CANADIAN PATENTS

Granted and Published Dec. 4, 1945

Cell design for the electrolysis of magnesium chloride fusions. No. 423,-009. The Consolidated Mining and Smelting Co. of Canada, Ltd. Withheld from publication, 3rd of Oct., 1944.

Process of manufacturing bituminous material having a high degree of elasticity, consisting in forming an intimate mixture of a blend of asphaltic bitumen and Lake asphalt, in a vegetable oil and sulphur and heating. No. 426,595. The Limmer & Trinidad Lake Asphalt Co., Ltd. (Donald Charles Broome, John Lewis, Sidney Charles Lewis). Withheld from publication, 3rd of April, 1945.

Coated fabric having a strongly adherent coating thereon, cellulose acetate of an acetyl value of 40 to 45 per cent, upon which is superimposed cellulose acetate of an acetyl value of 53 to 56 per cent. No. 431,570. Camille Dreyfuss.

Coating rough surfaces, applying to a composition having a basis of cellulose acetate of relatively low degree of acetylation 45 per cent (calculated as acefic acid) and then applying heat and pressure. No. 431,-571. Camille Dreyfuss.

Dental plate base comprising a plasticizer-free and water-insoluble organic ester of cellulose of a relatively low degree of esterification. No. 431,-574. Camille Dreyfuss.

Method of producing oil-soluble phenolic resins suitable for use in the manufacture of coating compositions, which comprises reacting a phenol, a terpene material, and an inorganic chloride of an acid-forming element until a soluble resinous material is obtained, and then removing the acid-forming element from the product. No. 431,598. Israel Rosenblum.

Terpene-modified phenolic resin. No. 431,599. Israel Rosenblum.

Liquid adhesive composition. Composed of 100 parts of butadiene acrylonitrile copolymer containing acrylonitrile; 100 parts pyroxylin, 1.5 parts stearic acid, 5 parts zinc oxide, 2 parts sulphur, 20 parts calcium silicate, 600 to 800 parts of solvent. No. 431,615. B. B. Chemical Co. of Canada, Ltd. (Jan Teppema, Joseph F. Manning).

Liquid adhesive composition. Composed of 100 parts butadiene-acrylonitrile copolymer containing 25 per cent acrylonitrile, 100 parts copolymer of vinyl chloride and vinyl acetate, 1.5 parts stearic acid, 5 parts zinc oxide, 2 parts sulphur, 20 parts calcium silicate, 600 to 800 parts solvent. No. 431,616. B. B. Chemical Co. of Canada, Ltd. (Jan Teppema, Joseph F. Manning).

Method for deodorizing glyceride oils having an unpalatable flavor, of the class comprising soya bean oil, linseed oil, and sunflower oil, comprising passing dry steam through the oil while maintained at a temperature of about 250 to 350° C. under a reduced pressure to remove unsaponifiable matter. No. 431,620. The Best Foods (Canadian), Ltd. (Ralph H. Neal).

Process of preparing ethylidene dimethacrylate by reacting methacrylic anhydride with acetaldehyde in the presence of anhydrous ferric chloride. No. 431,630. Canadian Industries, Ltd. (Henry John Richter).

Process for manufacturing cementitious materials. New composition of matter containing from about 0.005 per cent to about 0.30 per cent by weight of a size containing a predominant amount of saponified pine wood resin. No. 431,649. Hercules Powder Co. (George Frederick Hogg).

Plastic, soluble reaction product of the simultaneous heating of a phenol, an aldehyde, and dipentene. No. 431,653. Libby-Owens-Ford Glass Co. (Israel Rosenblum).

Electric contact formed of 1 to 10 per cent of refractory oxide selected from the group consisting of the oxides of beryllium, magnesium, calcium, strontium and barium and the balance substantially all contact metal. No. 431,657. P. R. Mallory & Co., Inc. (Franz R. Hensel, Earl I. Larsen).

Obtaining vitamin K_2 by extracting a natural product containing vitamin K_2 with an organic solvent, adsorbing the vitamin and impurities from said extract onto a zeolite adsorbent. No. 431,710. President and Board of Trustees of St. Louis University (Sidney A. Thayer, Stephen B. Binkley, Ralph W. McKee, Donald W. MacCorquodale, Edward A. Doisy).

Apparatus for winding freshly spun viscose thread. No. 431,716. Cornelius Constantinus Vanderhooven, Enka (James Joseph Polak, Arthur Laurence Jackson).

Granted and Published Dec. 11, 1945

Method of forming a thin flat thermoplastic sheet into a cupped formation. No. 431,736. Gustave W. Borkland.

Aliphatic carbylamines comprising a chain of at least 10 carbon atoms. No. 431,738. Henry Dreyfuss.

Compound for lining can ends comprising a linear polymer of polybutene, and a filler including wood flour. No. 431,771. American Can Company (John E. Robinson, Glen Ellyn, Frank H. Bopp, Paul W. Millelot, Jr.).

Solid preparation comprising one or more plant hormones dispersed in a block of polyethylene oxide. No. 431,780. Boyce Thompson Institute for Plant Research, Inc. (Percy W. Zimmerman, Albert E. Hitchcock).

Fired ceramic product comprising particles of calcined gypsum bonded by a glass-like binder. No. 431,786. Canadian Gypsum Co., Ltd. (Harry K. Linzell, Joseph W. Gill).

Making a lasting record by exposing an emulsion of zinc cadmium sulphide and manganese in the presence of moisture to ultra-violet light. No. 431,818. Allen B. Du Mont Laboratories, Inc. (Peter Samuel Christaldi, Albert Steadman, David Truston Wilber).

Treating wool and wool goods to render them resistant to felting which comprises treating them with dilute solution of a hypochlorite and sufficient carbon dioxide to saturate the solution. No. 431,822. Finishing Processes (Textiles), Ltd. (Ellis Clayton).

Quick-drying printing ink composition comprising a pigment and a vehicle including zein, a water soluble phenol-formaldehyde resin and a water-soluble glycol in which the zein and resin are dissolved. No. 431,836. Fred'k H. Levey Co., Inc. (John W. Kroeger, Harry F. O'Connor).

Production of N,N-diethyl-l-amino-4-pentanol by reacting 1,4 pentanediol with diethylamine in the presence of a nickel hydrogenation catalyst at a temperature of 120° to 180° C. No. 431,849. Monsanto Chemical Co. (Lucas P. Kyrides).

Adhesive paper having on one side thereof a thin, dry, remoistenable, substantially non-hygroscopic adhesive film of a water-soluble polyvinyl alcohol. No. 431,882. The Western Union Telegraph Co. (Bernard Leh Kline).

Granted and Published Dec. 18, 1945

Apparatus for the separation of oil from water contaminated therewith. No. 431,920. (George Rodham Unthank, Arthur John Silley).

Reducing the adhesiveness of surfaces of adhesive organic plastic interlayer sheeting of the composition, Polyvinyl butyral resin 66.0 per cent dibutyl sebacate 28.3 per cent aqueous ethanol 5.7 per cent, immersing sheeting in a mixture of concentrated hydrochloric acid, and for approximately one minute, neutralizing the hydrochloric and residue remaining on the surfaces of said sheeting, washing said sheeting with an aqueous solution to remove the resulting salt from said sheeting and drying the sheeting. No. 431,941. Canadian Industries, Ltd. (Louis Paggi).

Oil well explosive composition adapted for use in deep wells comprising more than 90 per cent of liquid explosive nitric ester, sufficient nitrocellulose to form a firm gel with the liquid nitric ester, and between 0.5 and 5.0 per cent of a diphenyl-dialkyl urea. No. 431,944. Canadian Industries, Ltd. (Clifford Akeley Woodbury).

Coating composition containing vinyl chloride-vinyl acetate polymer 20 parts, methyl ethyl ketone 80 parts, butyl alcohol soluble urea-formaldehyde-butyl alcohol resin intermediate 1 part. No. 431,945. Canadian Industries, Ltd. (Harry Groff Stauffer).

Ethylene polymer welding method. No. 431,948. Canadian Industries, Ltd. (Wilfred Helmut Driesen, Malcolm MacKenzie Renfrew).

Coating a steel structure with aluminum which comprises wetting the surface of said structure with water, and applying molten aluminum to the surface containing substantially only water. No. 431,950. Canadian Industries, Ltd. (Harvey Nicholas Gilbert).

As a new chemical compound the formal of ethylene cyanohydrin. No. 431,951. Canadian Industries, Ltd. (Joseph Frederic Walker).

In the acid treatment of skins and hides in the manufacture of leather, the step which comprises treating the skins with a dilute aqueous solution of beta-hydroxybutyric acid. No. 431,963. Distillers Co., Ltd. (Herbert Muggleton Stanley, Karl Heinrich Walter Teurck).

Improving the flex-cracking properties of rubber compositions designed which comprises incorporating therein a catechol such as a para-tertiary-alkyl catechol. No. 431,967. Dominion Rubber Co., Ltd. (Robert Thexton Armstrong, Edwin James Hart).

Stabilizing soil by mixing with the soil Portland cement and a powdered pine wood resin in amounts from about 1,0 to about 5.0 per cent and from about 0.4 to about 2.0 per cent respectively. No. 431,979. Hercules Powder Company (Hazel E. Miller).

Cosmetic cream having chlorophyll uniformly distributed therein in an amount ranging from about .04 to about 3 per cent by weight. No. 432,002. Lakeland Foundation (Benjamin Gruskin).

Cell stimulating composition for use in treating wounds and infections, which composition has a hydrogen ion concentration in the range from about pH 6.0 to about pH 8.5, and comprises chlorophyll distributed in a carrier. No. 432,003. Lakeland Foundation (Benjamin Gruskin).

Oral cleansing preparation containing chlorophyll in therapeutically effective amounts. No. 432,004. Lakeland Foundation (Benjamin Gruskin).

Powdered, cell-stimulating composition for use in treating wounds and infections which composition comprises a powdered chlorophyll. No. 432,006. Lakeland Foundation (Benjamin Gruskin).

Substantially continuous process for the manufacture of metallic sodium. No. 432,024. The Solvay Process Co. (Raymond A. Vingee, Charles K. Lawrence).

Pre-pasted wall paper characterized as having a printed surface simulating cedar wood and having oil of cedar together with a retardant therefor incorporated into the paper stock. No. 432,034. Trimz Co., Inc. (Leroy W. Staunton, John W. Close, Roy A. Hess).

Trademarks of the Month

A Checklist of Chemical and Chemical Specialties Trademarks

418,601. Conrad Wolff, as The Rite-Products Co., Irvington, N. J.; filed Oct. 14, 1944; Serial No. 475,351; for powder to be added to molten steel; since September 1944.

418,606. Consolidated Vultee Aircraft Corp., San Diego, Calif.; filed Nov. 3, 1944; Serial No. 476,050; for thermo-setting synthetic resin adhesives; since Oct. 3, 1944.

418,616. Grant Photo Products, Inc., N. Y.; filed Dec. 28, 1944; Serial No. 478,001; for chemicals in photographs; since 1930.

418,826. Plastic Co. of America, Chicago, Ill.; filed Aug. 16, 1944; Serial No. 473,330; for liquid linoleum finish; since June 9, 1944.

469,210. B. F. Natoli, as Seagram Chemical Co., East Rutherford, N. J.; filed Apr. 10, 1944; for silver polish; since Feb. 2, 1932.

474,189. American Chemical Paint Co., Ambler, Pa.; filed Sept. 14, 1944; for exterminating weeds; since Aug. 10, 1944.

476,156. Warren B. Ferris, Chicago, Ill.; filed Nov. 6, 1944; for fluorescent plastic material; since Apr. 15, 1942.

480,239. International Chemical Co., Chicago, Ill.; filed Feb. 26, 1945; for dry deodorant; since July 1, 1928.

480,715. The Parker Pen Co., Janesville, Wis.; filed Mar. 9, 1945; for writing ink; since Feb. 26, 1945.

481,218. Emery Industries, Inc., Cincinnati, Ohio; filed Mar. 23, 1945; for plasticizing oils; since Mar. 12, 1945.

482,703. Rohr Aircraft Corp., Chula Vista, Calif.; filed Apr. 27, 1945; for heat-resisting sealants; since Dec. 15, 1944.

482,704. Rohr Aircraft Corp., Chula Vista, Calif.; filed Apr. 27, 1945; for sealing, gasketing and cushioning paste coating materials; since Dec. 20, 1944.

482,939. A. T. Malmed, as A. T. Malmed & Co., Philadelphia, Pa., to George W. Orth, Philadelphia, Pa.; filed May 3, 1945; for liquid concrete hardener; since Jan. 1, 1920.

483,558. Tec Chemical Corp., N. Y.; filed May 18, 1945; for proteolytic enzyme for leather bate; since May 14, 1945.

484,104. Research Products Corp., Madison, Wis.; filed June 2, 1945; for granular mineral base filtering material having active manganese coating; since March 1945.

484,105. Research Products Corp., Madison, Wis.; filed June 2, 1945; for granular mineral base filtering material for purifying water of dissolved iron and manganese compounds; since March 1945.

484,106. Research Products Corp., Madison, Wis.; filed June 2, 1945; for carbonaceous mineral filtering material for purifying water; since March 1945.

484,436. Atlas Powder Co., Wilmington, Del.; filed June 12, 1945; for lacquer for paper; since May 12, 1945.

484,551. Acme Chemical Co., Milwaukee, Wis.; filed June 15, 1945; for penetrating floor varnish; since Mar. 15, 1936.

484,677. First Pan-American Mercantile Corp., N. Y.; filed June 18, 1945; for stamp pad ink; since Apr. 1, 1945.

484,679. First Pan-American Mercantile Corp., N. Y.; filed June 18, 1945; for stamp pad ink; since Apr. 1, 1945.

484,747. Harry R. Lewis, as Harry R. Lewis Co., Warren, Pa.; filed June 19, 1945; for washing powder; since June 2, 1945.

484,905. Raw Asbestos Distributors, Ltd., Rochdale, Lancashire, England; filed June 22, 1945; for asbestos; since July 1939.

485,040. George E. Winborn, as The Climax Specialty Mfg. Co., Houston, Tex.; filed June 25, 1945; for semi-solid, insoluble valve compound; since June 24, 1944.

485,496. Herbert J. Heribert, N. Y.; filed July 6, 1945; for finishes for leather; since Sept. 1, 1944.

485,776. Irvington Varnish & Insulator Co., Irvington, N. J.; filed July 13, 1945; for extruded resenoid plastic; since May 26, 1945.

485,806. Arrow Eng. & Chemical Co., Inc., Flint, Mich.; filed July 14, 1945; for cleaning preparation; since July 5, 1945.

485,968. Retardex Co., Brooklyn, N. Y.; filed July 18, 1945; for disinfectant; since September 1942.

486,230. United States Rubber Co., N. Y.; filed July 24, 1945; for chemicals in rubber field; since June 2, 1939.

486,257. Hercules Powder Co., Wilmington, Del.; filed July 25, 1945; for nitrocellulose; since July 14, 1945.

486,425. Minnesota Mining & Mfg. Co., St. Paul, Minn.; filed July 28, 1945; for abrasive; since July 1944.

486,492. Kerr Dental Mfg. Co., Detroit, Mich.; filed July 30, 1945; for lubricant for mold; since June 8, 1945.

486,618. Hercules Powder Co., Wilmington, Del.; filed Aug. 2, 1945; for ester of hydroabietyl alcohol; since July 9, 1945.

486,719. Midwest Eng. & Tool Co., Neodesha, Kans.; filed Aug. 4, 1945; for insecticide; since July 21, 1945.

487,061. R. T. Vanderbilt Co., Inc., N. Y.; filed Aug. 11, 1945; for whipping and emulsifying agent for food; since July 25, 1945.

487,255. Hercules Powder Co., Wilmington, Del.; filed Aug. 18, 1945; for insecticidal uses; since July 27, 1945.

487,508. J. L. Haber & Co., N. Y.; filed Aug. 24, 1945; for thermoplastic film; since February 1945.

487,513. Michel Export Co., Inc., N. Y.; filed Aug. 24, 1945; for soapless detergents; since Jan. 29, 1945.

487,514. Michel Export Co., Inc., N. Y.; filed Aug. 24, 1945; for textile softeners; since Jan. 29, 1945.

487,552. Hafco, Valley Stream, N. Y.; filed Aug. 25, 1945; for insect repellent; since June 25, 1945.

487,569. Nuodex Products Co., Inc., Elizabeth, N. J.; filed Aug. 25, 1945; for wetting and dispersing agents; since December 1944.

487,825. Curoko Co., N. Y.; filed Aug. 31, 1945; for cleaning chromium, stainless steel; since June 8, 1945.

487,869. Specialty Products Co., Jersey City, N. J.; filed Aug. 31, 1945; for synthetic wax for sizing yarn; since Nov. 30, 1944.

488,050. Puritan Labs., Inc., Des Moines, Iowa; filed Sept. 6, 1945; for insecticidal hog oils; since Apr. 6, 1944.

488,268. Hercules Powder Co., Wilmington, Del.; filed Sept. 11, 1945; for menthylphenol; since Aug. 14, 1945.

Trademarks reproduced and described include those appearing in Official Gazette of U. S. Patent Office, Dec. 25-Jan. 15.

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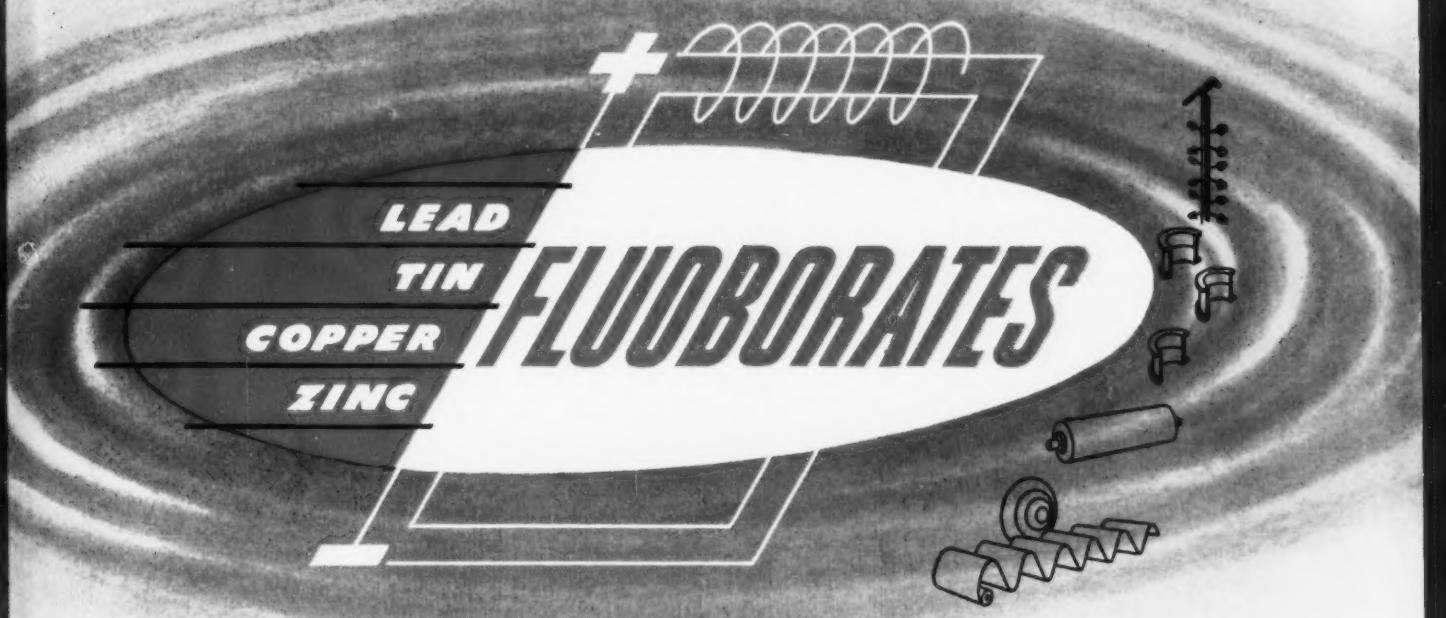

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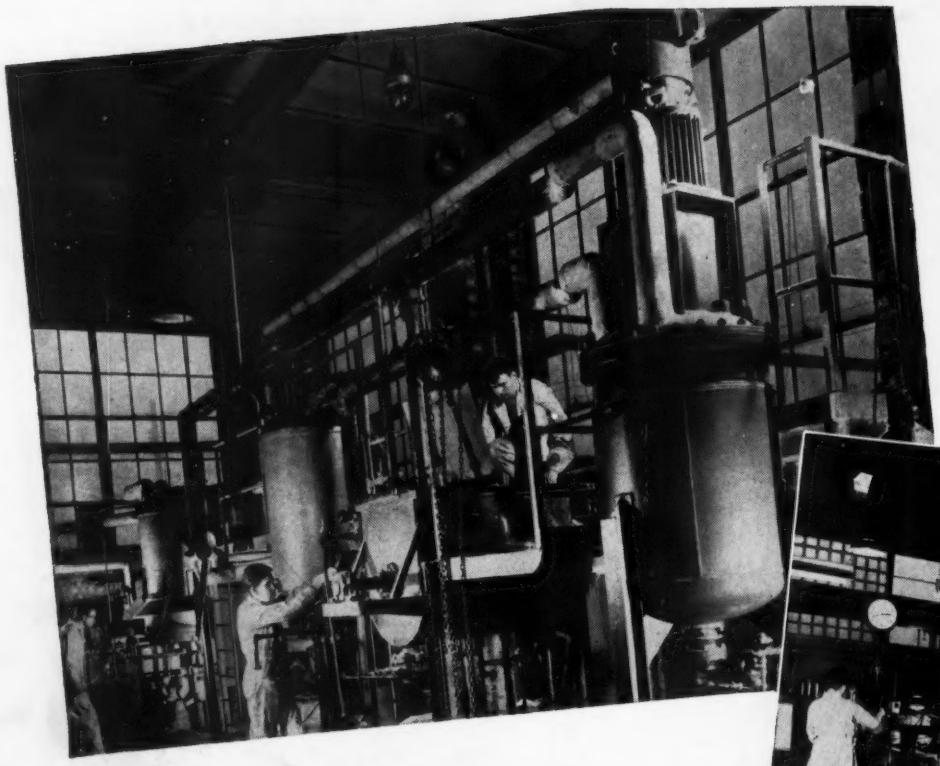
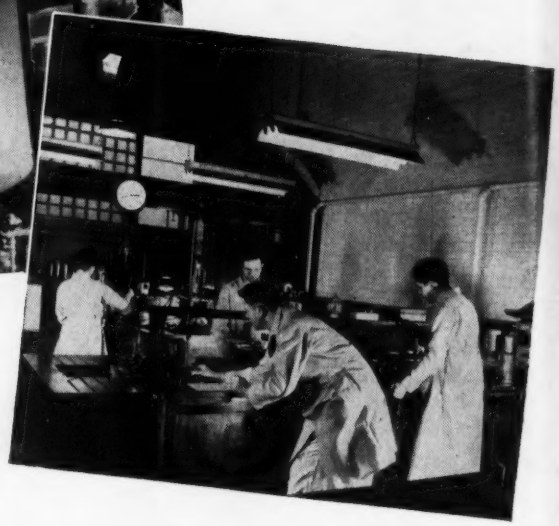
Metal Fluoborates BULLETIN 1015-A
General information on Metal Fluoborates, plus specific operating data on plating with Lead, Tin, and Cadmium Fluoborate.



This section of Witco's new pilot plant—constructed for Witco research service—is equipped to simulate actual plant operations for studies in the large-scale production of new asphaltic and specialty products. Shown here is a battery of jacketed mixers and reactors.



WITCO RESEARCH
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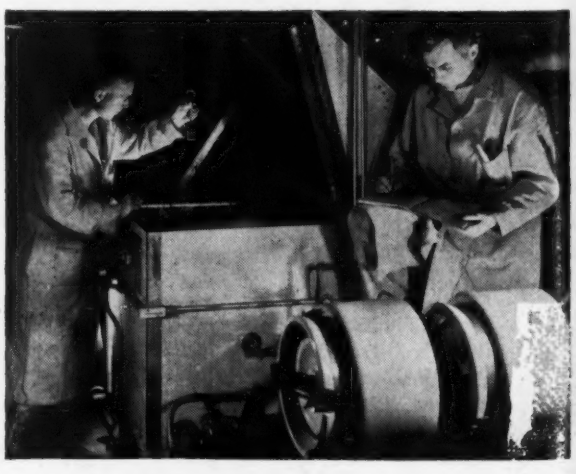
In this particular room, specialized facilities and personnel are devoted exclusively to research in asphaltic and wax compositions. In other Witco laboratories, modern equipment and trained staff members study rubber-compounding; paint and ink-making; pigments and oils; and chemical specialties.

Research and development at Witco have been expanded through the completion of new pilot plant facilities in connection with the Research Laboratory in Chicago. This is another example of Witco's objective to work closely with industry. These new facilities not only permit development of products benefiting the industries using rubber, asphalt, plastics, pigments, oils, etc., but also provide opportunity for adapting laboratory-developed products and processes to a plant scale of operation. This is concrete evidence of Witco's belief that only through sustained research and pilot plant activities can industry be continuously and efficiently served.

Determining the corrosion preventative characteristics of rust-inhibitor films. The operator on the left is examining a sample just tested in a salt-spray cabinet. In the foreground is an experimental ball mill used in the preparation of pigmented protective coatings.



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